

THE
PRAIRIE FARMER
HORSE BOOK

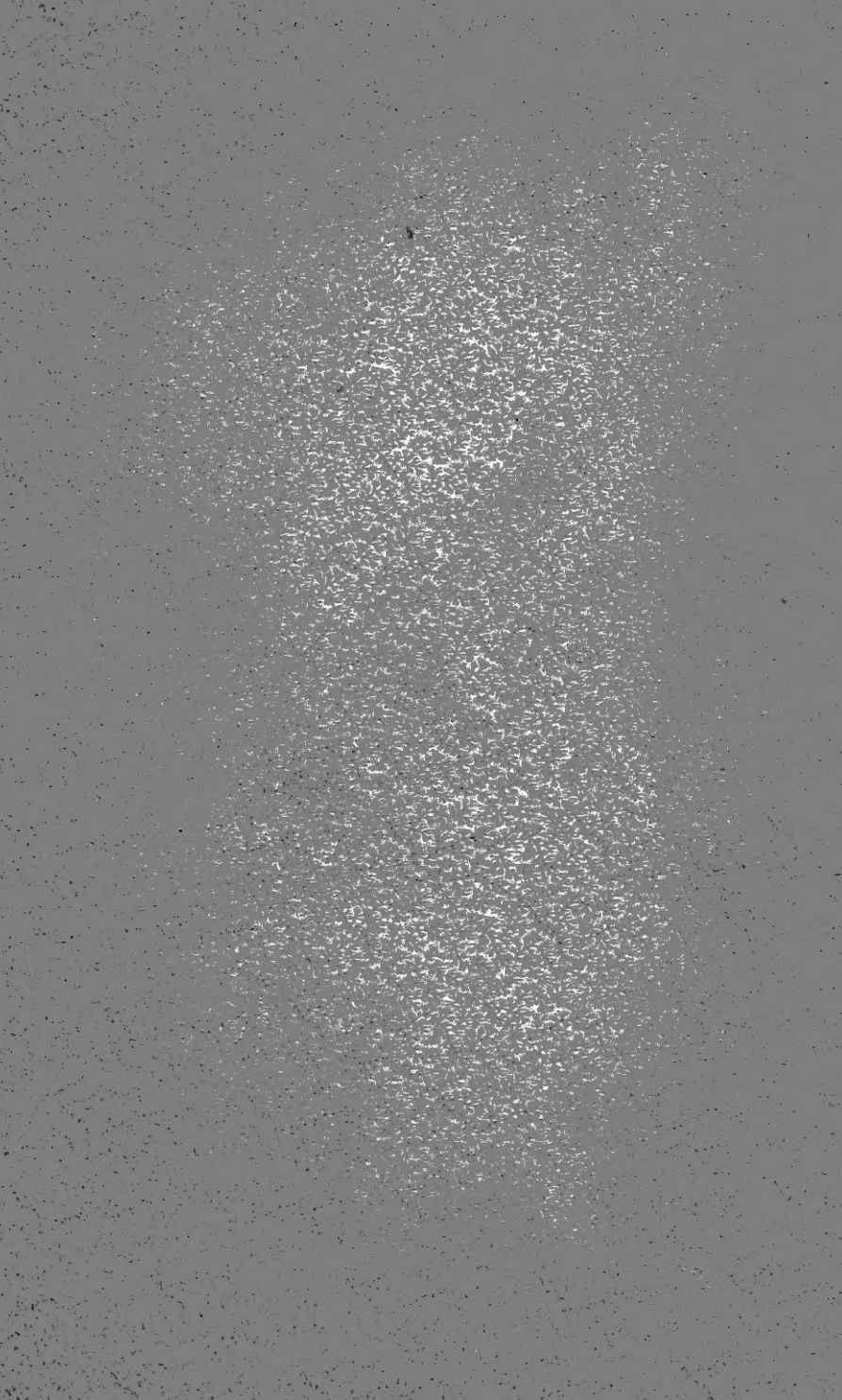


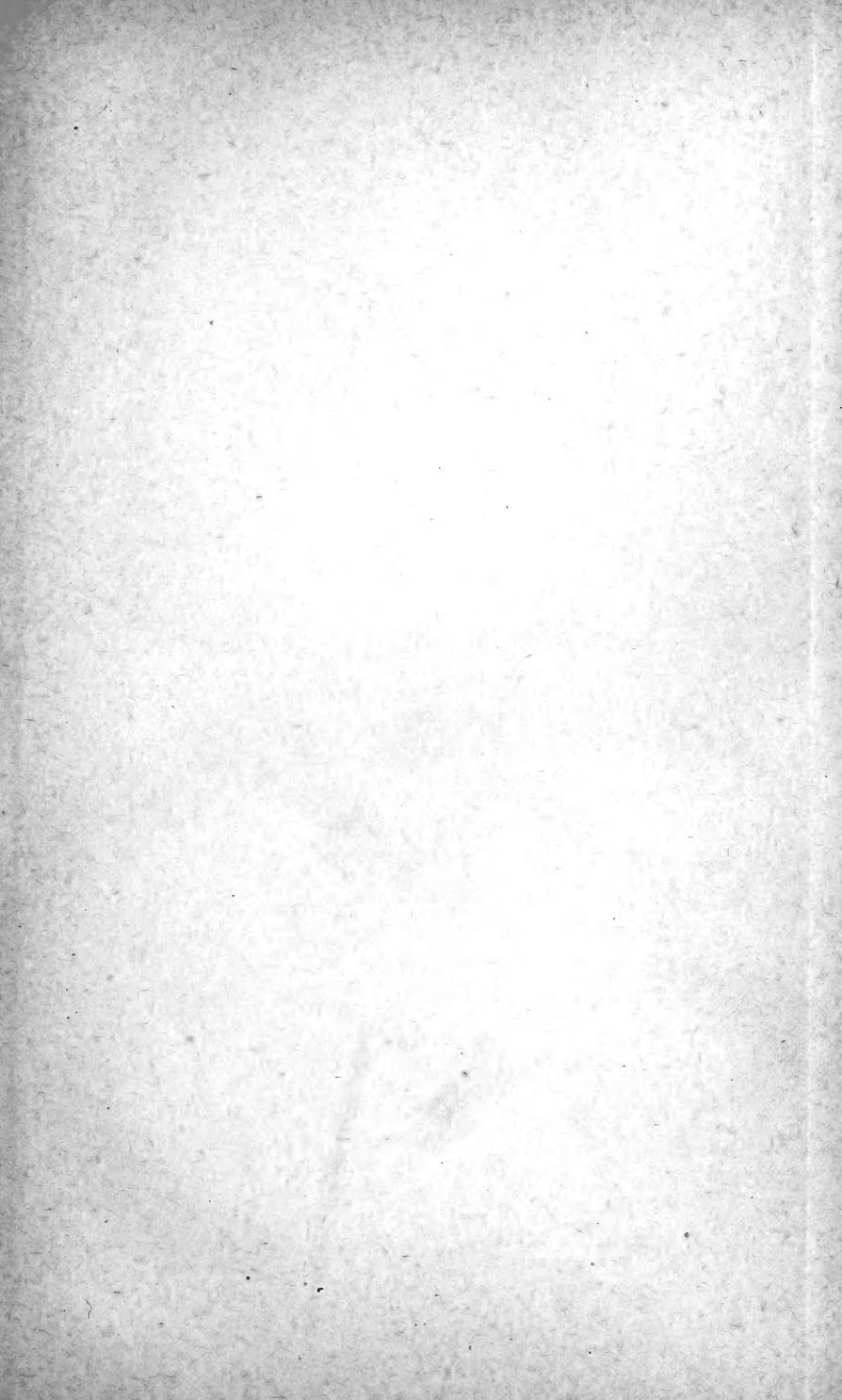
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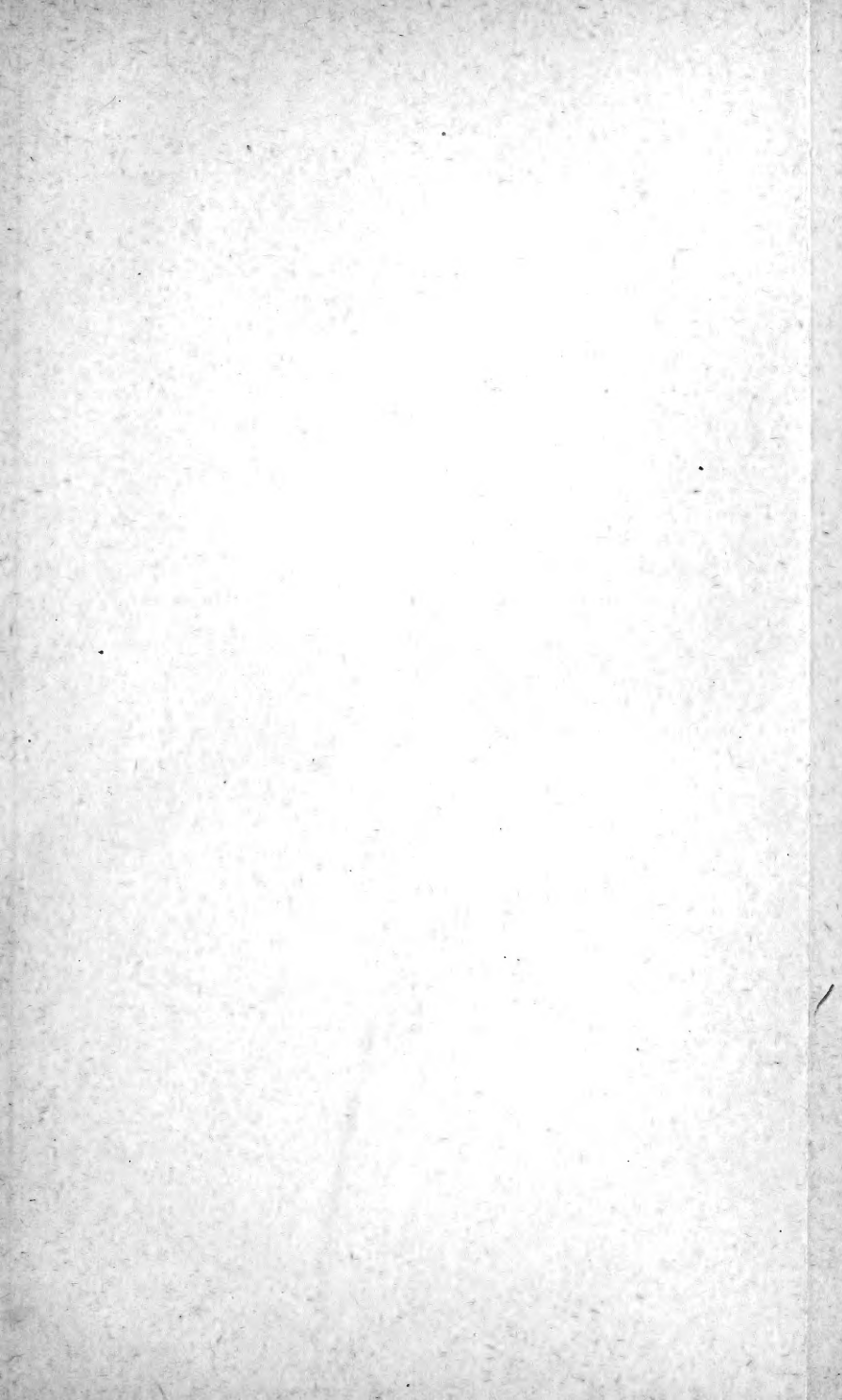
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UNITED STATES OF AMERICA.









THE PRAIRIE FARMER

HORSE BOOK.

A

CONCISE MANUAL FOR HORSE OWNERS.

EMBRACING

BREEDS AND CHARACTERISTICS; CARE AND MANAGEMENT; FEEDING AND
CLEANING; STABLE VENTILATION AND CARE; VICES AND UNSOUND-
NESS; HOW TO TELL THE AGE; BONES AND MUSCLES;
THE LIMBS AND FEET; DISEASES AND REMEDIES;
VETERINARY PRESCRIPTIONS, ETC., ETC.

FROM THE BEST MODERN AUTHORITIES.

BY

JONATHAN PERIAM,

EDITOR THE PRAIRIE FARMER; PROFESSOR HYGIENE, CARE, AND MANAGEMENT OF
ANIMALS, CHICAGO VETERINARY COLLEGE; AUTHOR OF WORKS ON
HORSES, CATTLE, SHEEP, SWINE, POULTRY, ETC., ETC.

OVER ONE HUNDRED FINE ENGRAVINGS.

CHICAGO:

THE PRAIRIE FARMER PUBLISHING COMPANY,

Rand-McNally Building, 166-168 Adams St.

1891.



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The Prairie Farmer Horse Book.

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PREFACE.

THE PRAIRIE FARMER HORSE BOOK was undertaken in consequence of repeated inquiry from friends for something that should combine the experience of the writer, and others, in the breeds and breeding of horses, care and management, hygiene in relation to stable care, unsoundness, vices, and the treatment of common diseases. Feeding was also suggested as an important matter. This latter, however, has not been treated of, except incidentally, and for the reason that the grains, sound oats and Indian corn principally, with sweet hay, are the natural foods of the horse, and must be generally relied on, except in case of sickness, in which event the proper foods are specifically mentioned.

We do not believe in a long preface to a book, and this will be short. Where we have drawn upon creditable authorities, credit has been given. We have brought together some graphic illustrations from masters in delineation, old as well as new. In veterinary medicine and surgery, Doctor Paaren, a long-time conductor of the Veterinary Department of THE PRAIRIE FARMER, has been largely relied on. In some departments, among other authorities, we have quoted freely from Fitzwygram, one of the most advanced of the later English authorities on the management and cure of the Equine Race. To simplify the work, we have divided the reading-matter into parts,

thus making each department easy to find and identify. Where scientific terms are used, the explanations are given in the context, so far as possible. That the book shall fairly reach the intention desired is the hope of the author and compiler.

JONATHAN PERIAM.

CHICAGO, ILL.

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THE PRAIRIE FARMER HORSE BOOK.

PART I.

CHARACTERISTICS OF PRINCIPAL BREEDS.

I. The Horse for Work and Speed.—In the early history of the world, the horse was used for the chase and for war; the ass, and later, the mule, for labor. Except in warm countries, the horse is, at the present day, an animal of general use, for speed, pleasure, and labor; and the higher the civilization, the greater adaptability does the horse show for all contingencies where he may prove the most useful servant and friend of man.

The horse combines, in the highest degree, bone, sinew, and muscle to endure the most violent exertion. His nervous system is of the first order. The lungs are immense; while the heart, with the arterial and venous system, is most ample for the supply of blood to every part. His frame is perfection, carrying no spare fat. In this connection we quote the words of the late J. H. Walsh, F. R. C. S. ("Stonehenge"), who wrote:

One of the greatest peculiarities in the structure of the horse is the small size of his stomach, which is also of a very simple nature. He is likewise without a gall-bladder, showing that the digestion must be continuous, and not interrupted by distinct intervals, as in the ruminants and carnivora. Nature has thus framed this animal in order that he may be at all times able to exert his utmost speed, which he could not do with the mass of provender in his stomach which is carried by the cow or sheep. The same provision is shown in the udder of the mare, which is not larger than that of the goat or sheep.

II. The Arab Horse.—With the ancient horse we have little to do, until we come to one of his descendants—the modern Arab—and here only so far as the latter has stamped his impress upon those breeds that are to-day among the most valuable. The thoroughbred horse of Great Britain and America owes much of his value to the infusion of the Arab and the Barb blood of 150 to 200 years ago. Not only has the Arab modified for good the old English racing-horse, but the latter's progeny—the thoroughbred—has left his impress, more or less, upon every valuable modern English horse.

III. The Thoroughbred.—We present an illustration to elucidate this subject, and quote the description by "Stonehenge" of the proportions and component parts of the horse; it being understood that reference is had only to the racer, the hunting-horse (modified racing-horse), and the better class of driving-horses; but by no means the draft-horse. This scale is drawn in inches, and in the outline the horse is supposed to be fifteen hands three inches, or sixty-three inches high. The measurements are the average of those carefully taken from six horses considered to be of perfect symmetry. Two of these were celebrated stallions, two thoroughbred hunters, and two chargers of great value.

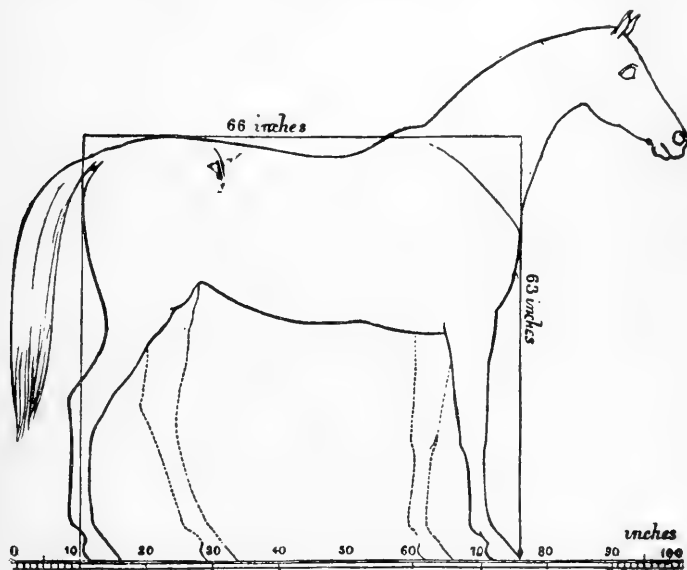
	Inches.		Inches.
Height at withers and croup . . .	63	From the withers to the hip . . .	22
Length from shoulder-point to quarter	66	From the stifle to the point of the hock, in the attitude shown in the plan	28
From the lowest part of chest to the ground	36	From the root of tail to stifle-joint	26
From the elbow-point to the ground	39	From the point of the hock to the ground	22½
From the withers to the pole, just behind the ears, <i>in a straight line</i>	30	Length of arm from the elbow to the pisiform-bone	19½
The same measured along the crest	32	From the pisiform-bone to the ground	19½
Length of head	22		
Width across the forehead	9½		

Girth varies from 76 to 79.

Circumference of fore cannon-bone, 7½, 8, 8, 8½, and 9 inches.

Circumference of arm just below the elbow, 16½ to 18 inches.

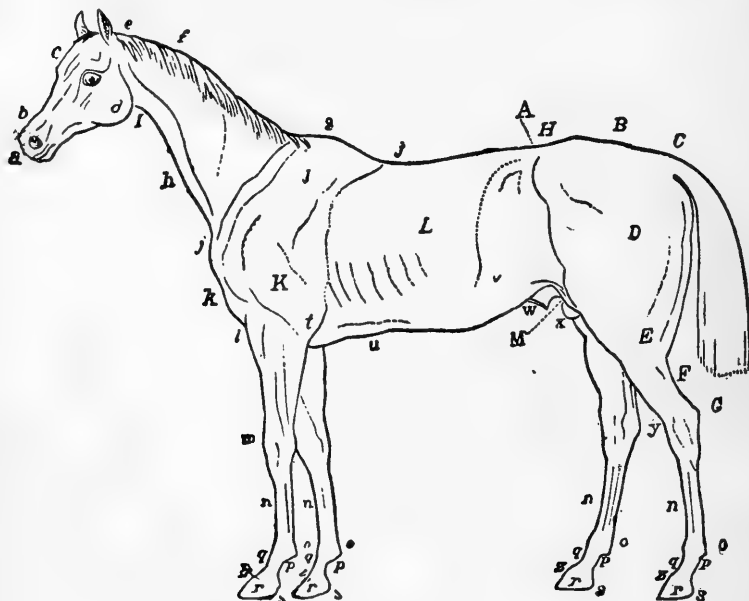
On comparing these measurements with those of Eclipse, as recorded by St. Bel, it will appear that there is some considerable variation from those of that celebrated horse, which he is said to have measured during life, and to have also checked his dimensions after death. Thus, though Eclipse was very low before, and yet was sixty-six inches high, his head was twenty-two inches long, being the same as the average length of the six horses given by



Proportions of the Horse.

Walsh, though they are three inches lower at the withers, and at least five inches lower at the croup. Again, though thus shown to be particularly short, it must have been of extraordinary width; for, according to the same authority, it measured one foot across *below* the eyes; but, as Mr. Percivall remarks, this must be a mistake for *above* the eyes. Indeed, he can not help thinking, in accordance with the opinions of the above distinguished English veterinarian,

that in other respects "there appears some discordance in his admeasurements" of Eclipse. Nevertheless, it may safely be assumed, according to Mr. Percivall's summing up, that "he was a big horse in every sense of the word; he was tall in stature, lengthy and capacious in body, and large in his limbs. For a big horse, his head was small, and partook of the Arabian character. His neck was unusually long; his



Points of the Horse.

a, Muzzle; b, Face; c, Forehead; d, Jowl; e, Poll; f, Crest; g, Withers; h, Windpipe or thrapple; i, Back; j, Point of the shoulder; k, Breast or chest; l, Fore-arm; *vulgo*, arm; m, Knee; n, Cannon-bones; o, Fetlocks; p, Small pasterns; q, Large pasterns; r, Hoofs; s, Heels; t, Elbow; u, Girth; v, Flank; w, Sheath; x, Scrotum; y, Hocks; z, Coronets; A, Hip; B, Croup or rump; C, Dock; D, Quarter; E, Thigh; F, Hamstring; G, Point of the hock; H, Loins; I, Gullet; J, Shoulder; K, Arm (*proper*); L, Barrel (the ribs); M, Stifle.

shoulder was strong, sufficiently oblique, and, though not remarkable for, not deficient in depth, his chest was circular; he rose very little in his withers, being higher

behind than before; his back was lengthy, and over the loins roached; his quarters were straight, square, and extended; his limbs were lengthy and broad, and his joints large; in particular his arms and thighs were long and muscular, and his knees and hocks broad and well formed."

The points of the horse are no less important as a careful study. The outlines are from a celebrated English race-

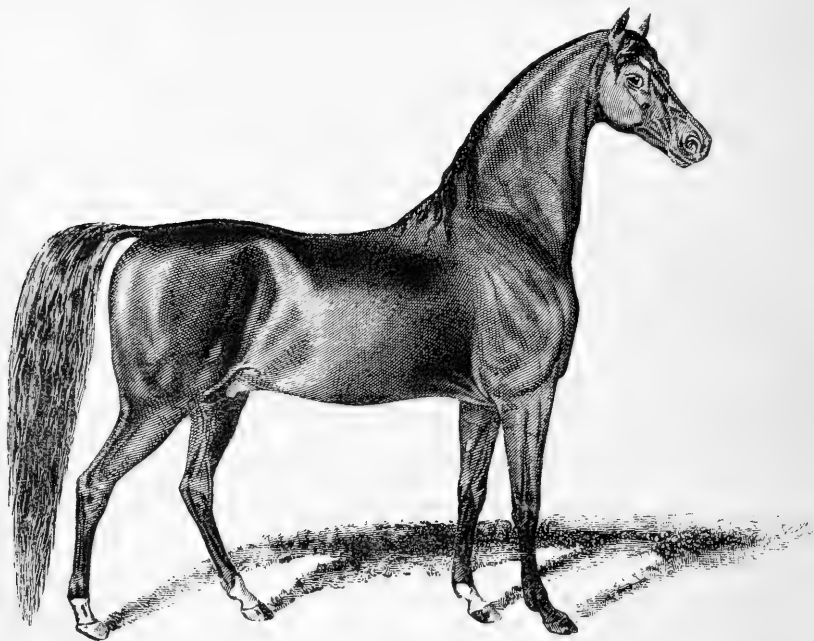


Imported Sir Archy (Thoroughbred).

horse, and the figures accompanying will give a correct idea of the various parts as seen from the outside.

As showing the characteristics of the thoroughbred horse, we introduce a picture of Sir Archy, drawn from life. It represents a model that has, to-day, few, if any, superiors for stamina; a horse of great bone, muscle, and gen-

eral substance, including eminent style, and the power to go long distances at a terrific pace. The sire of Sir Archy was the imported horse Diomed; his dam, the imported mare Castianira. He was undoubtedly among the very best of American horses, in the early part of the century,



Ethan Allen.

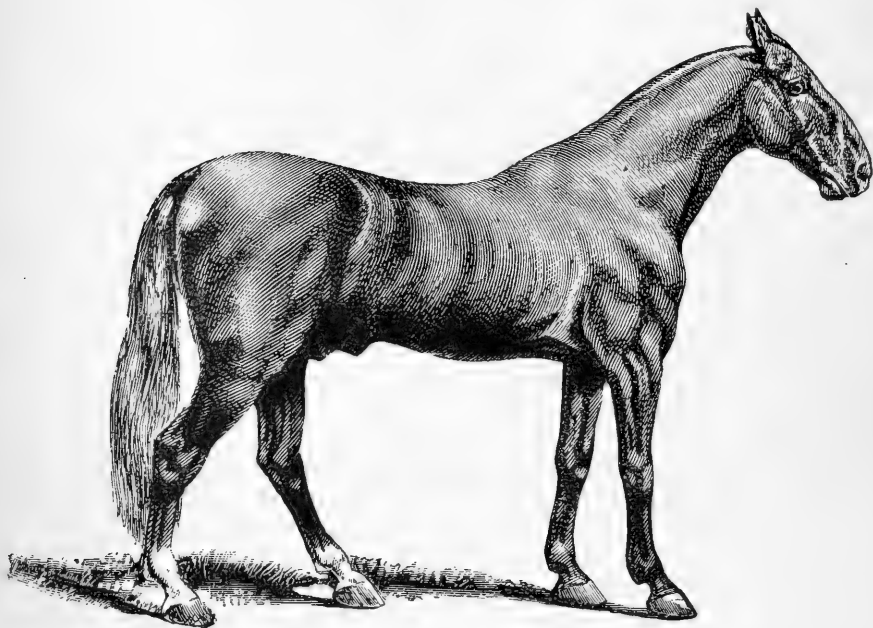
when staying qualities were held in high esteem. The model is a good study for any horse, big or little, except the draft-horse. A reference to the English Stud Book will show his high lineage.

IV. The Trotting-Horse.—The trotting-horse is distinctively American. No other country has ever been able to compete with us in the production of this wonder-

ful descendant of the thoroughbred. Among the trotting stock of forty years ago, the Morgan attained great celebrity; but to-day, they can not hold their own with the better bred. As road-horses, they were unimpeachable; and, probably, they were the best pony-horses America has ever produced. Handsome, active, sound, good for an all-day or an every-day drive, docile, yet of great spirit and mettle, courageous and intelligent to an eminent degree. The real origin of the horse is unknown, notwithstanding the earnest efforts to arrive at his lineage. That the strain comes of thorough-blood on one side, there is no doubt. Among the more elegant and meritorious of this breed is Ethan Allen, by Morgan Black Hawk; dam, a white mare, said to have been of Messenger blood; and hence we give his portrait as a model of a fast-going, pony-built, most stylish horse.

V. The Modern Trotting-Horse.—In this later day, however, the trotting-horse and the rich man's road and driving horse must have, first of all, speed, and then all the style that can be gotten into him. To accomplish this, there is required the best breeding for stamina, speed, and elegance combined that can possibly be obtained. These qualities are to be found in the descendants of "imported Messenger," through the great Rysdyk's Hambletonian. Hambletonian was not a handsome horse, but he had wonderful make-up in bone, sinew, and muscle. He was descended, on the male side, from "imported Messenger," a thoroughbred, through his dam, Mambrino, and Mambrino's son, Abdallah, out of a mare of unknown blood, which, in turn, got Rysdyk's Hambletonian out of a mare by "imported Bellfounder," the latter being known in his day, in England, as the Norfolk Trotter. Through Rysdyk's Hambletonian, on the male side, America has the

Volunteers, Edward Everetts, Alexander's Abdallahs, Almonts, Messenger Durocks, Sentinels, Dictators, and many others, all of which have taken their names from their respective celebrated sires. The best trotters of to-day are



Rysdyk's Hambletonian.

all of this original Messenger blood, though of late years there has been a great infusion of thorough-blood running through the female lines. Hambletonian was foaled in 1849, bred in Orange County, N. Y., and died March 26, 1876.

PART II.

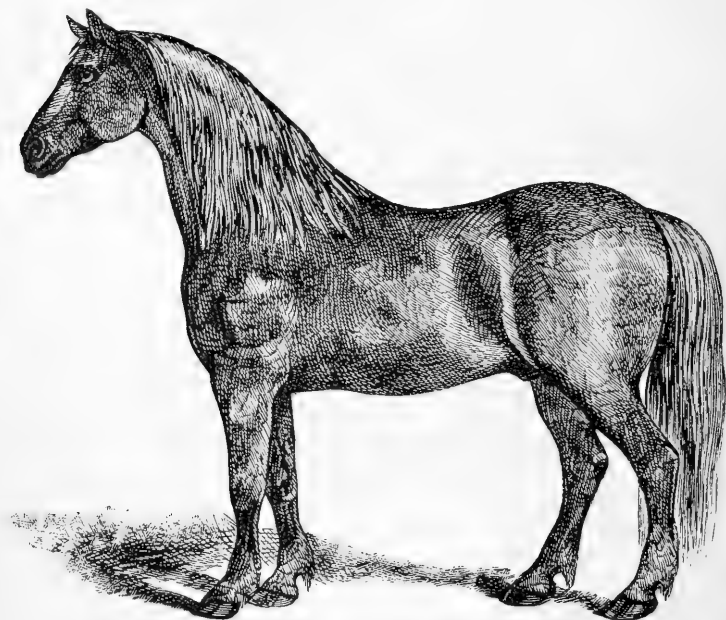
DRAFT-HORSES.

I. Old American Types.—While the American trotting-horse has gained a world-wide celebrity, it is the draft-horse, more than any other, that concerns the farmer. This class it is that moves the city and the country traffic, and is no less valuable for farm purposes. Among those now practically extinct is the Vermont draft-horse, a wonderful horse of half a century ago, and up to 1860; a horse sixteen hands high, rather over than under, pony-built, honest, active, handsome, and full of courage at a pull, whether the load started at the first attempt or only after a series of efforts. Under a good driver, the load was sure to come eventually, and for the reason that this kindly dispositioned and mighty horse—for his inches—never flinched at each successive pull.

Another wonderful horse, no longer known as a distinct breed, is the Conestoga, an illustration of which we give as he was known to the writer fifty years ago. There is no doubt that this great horse was originally of Flemish blood. In the early part of the century, the Conestogas made up the seven and nine horse teams that were capable of pulling a thousand pounds to the horse over the Alleghanies, between Pennsylvania and New York City. As modified by the German settlers of Pennsylvania, the Conestoga was a big horse, sixteen and a half to seventeen hands high, docile, muscular, strong-boned, and honest at a pull. The portrait given furnishes a fair idea of his appearance. The

somewhat crooked hind limbs, the great bone and sinew, together with the wonderful muscle and an even temper, made him, at that early date, a model of what a draft-horse should be—light-actioned, active, and honest at a long up-hill pull, and good at holding back on a down grade.

II. The Modern Draft - Horse.—The old - time horse had, however, to give way to the modern, distinct



The Conestoga Horse.

breeds as now known. The English and the French draft-horses are superior, in general respects, to those that have preceded them. The Clydes, Shires, and Suffolks of England, the Percherons and Normans of France, and the heavy Belgians, with perhaps the Cleveland Bays, fill the

bill perfectly for light and heavy draft. The Cleveland Bay, however, comes nearer to the coach-horse than to the draft; hence, he will be considered under the head of "coach-horses."

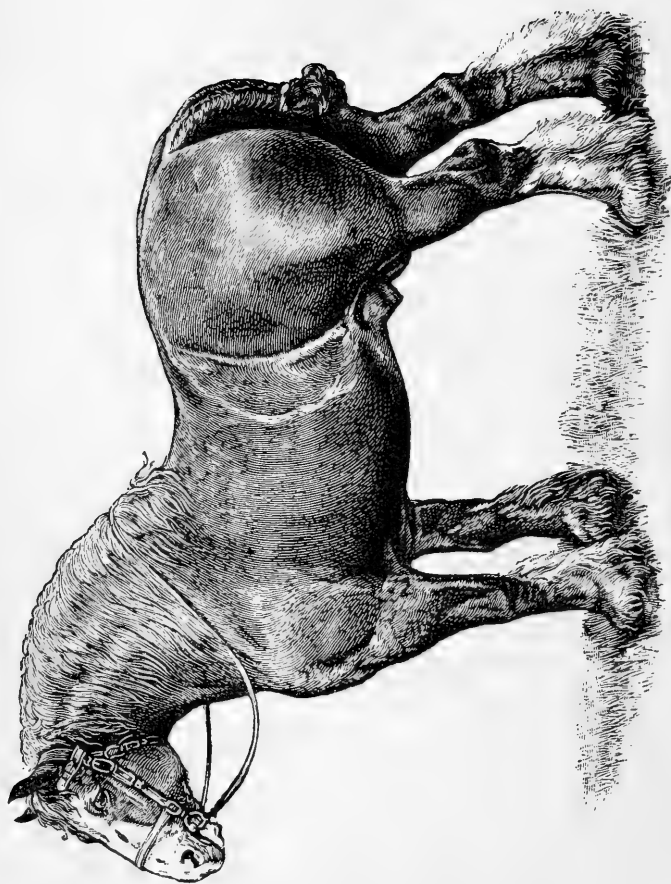
III. English Draft-Horses.—THE SHIRE HORSE. —Normandy and Flanders are, without doubt, the original homes of the draft-horse of England. The Shires, Clydes, and Suffolks from England, and the Percheron, Norman, and Belgian from Europe, have filled this country fairly well with the best draft-horses of the world. It will not be possible, in the scope of this book, to enter into a history of the several breeds. We purpose, by illustrating models of the best of the above classes, to give object-lessons rather than extended descriptions.

The draft-horses of England owe their origin to the continent. They have all been more or less modified by an occasional infusion of stanch thorough-blood; while careful selection and good feeding have made them the peers of any horses on earth for heavy draft. Hence, the English draft-horse—like the thoroughbred—"may be of any color if he be a good horse."

I. THE ENGLISH SHIRE HORSE.—The Shires run to gray, bay, and brown. A society was organized in 1879, in England, and a stud book of the Shire—at that time sometimes called the cart-horse—was published. In the introduction to the first volume of the "Shire Stud Book," Mr. R. S. Reynolds, M. K. C., V. S., makes the following statements regarding different original types:

It is perhaps worthy of observation that there were, and still remain, some specimens of three apparently distinct types of draft-horses, exemplified by differences in the local distribution of long hair.

1st. Horses having the upper lip garnished with a long, thick mustache, considered at one time a distinguishing



A Typical English Shire Horse.

characteristic of the Lincolnshire horse. The color of these appendages is always black, white, or a mixture of the two, and invariably corresponds with the hue of the skin from which they spring.

2d. Horses having the lips, muzzle, and eyelids destitute of hair. The skin in these situations, being either entirely bald or covered with exceedingly fine down, is almost invariably flesh-colored, sometimes marked with small dark spots and blotches. Specimens of this type may possibly have originated the appellations "bald horse" and "bald-faced horse."

3d. Horses having a long tuft of hair growing from the front of each knee, and rarer examples having also a similar growth (quite distinct from the ordinary hair of the back of the cannons) from the hind part of the hock, just below its point. Animals of this type are now seldom seen. In my experience they are more frequently met with in Wales than in the English shires, though no reason can be assigned why that is so. It is found that these peculiar hirsute growths invariably accompany a luxuriant development of long hair in its ordinary situations, and generally a more than ordinary strength of bone below the knees and hocks. Sex does not appear to exert any influence in determining the special characteristics of any of the three types—stallions, mares, and geldings being equally prone to inherit these peculiarities from progenitors similarly possessed.

As a model of the English Shire horse of the first quality, the celebrated sire, Honest Tom, will suffice.

2. THE CLYDESDALE HORSE.—It is not necessary to go into the history of the Clydesdale horse. He is a good horse wherever found, and, like any other horse, is good, whatever be the characteristic color. In Scotland they were mentioned as far back as 1352. The editor of the "Clydesdale Stud Book" does not say whence they came, but Scotch authorities are generally agreed that the breed was brought toward perfection in the Upper Ward of Lanarkshire. In volume 1, of the "Clydesdale Stud Book," we find the following bearing on the point:

Sometime between 1715 and 1720, John Paterson, of Lochlyoch, on the estate and in the parish of Carmichael, grandson of one John Paterson, who died at Lochlyoch in 1682, went to England and brought from thence a Flemish stallion, which is said to have so greatly improved the breed in the Upper Ward as to have made them noted all over Scotland. The Lochlyoch mares were famous in the Upper Ward during the latter half of the last and the first two decades of the present century; and a Mrs. Paterson, of Lochlyoch, mother of the present tenant of Drumalbin, now ninety-seven years of age, still has recollection of a noted black mare from which many of the best stock in the Upper Ward are descended. The family tradition is strongly supported by the fact that the Patersons were in the habit of noting down important agricultural items from a very early period; and the present representative of the family, Mr. Paterson, of Drumalbin, has in his possession a family tree of all the descendants of that John Paterson who died in 1682. In the year 1836, in reference to a day's plowing given to one of the Patersons on leaving Lochlyoch for Drumalbin, the following remarks appeared in an Edinburgh newspaper, from which it will be seen that their claim to being the founders of the breed was then recognized. After descanting on the merits of the family and kindred topics, the writer proceeds: "And it may here be worthy of remark, that it was a brother of Mr. Paterson's grandfather who brought the notable stallion from England to Lanarkshire—the sire of the famous Clydesdale breed of horses of which the county has been so long and justly proud."

What were the distinguishing features of the native breed previous to the introduction of the Flemish horse, about 1715, can not now be definitely determined, but there can be little doubt that they are mostly of English origin, and of a mixed character. The old "drove-road" from Scotland to England crosses the Clyde at Hyndford Bridge, and leads across the hills by Carmichael and Crawfordjohn—the very center of the then horse-breeding district; and the intercourse which the farmers would thus have with their neighbors from the south, and the amount of traffic done by pack-horses, would doubtless allow of



A Clydesdale Mare.

many opportunities for selecting animals calculated to improve the breed.

Lochlyoch mares were generally browns and blacks, with white faces and a little white on their legs; they had gray hairs in their tails, occasional gray hairs over their bodies, and invariably a white spot on their bellies, this latter being recognized as a mark of distinct purity of blood.

Bay, brown, and black are prevailing colors, but there are grays and chestnuts, and some distinctly sorrel. Like many of the Shires, white markings on the face, legs, and feet are characteristic, as also is the long, fine, glossy hair from the knee and hock to the fetlock, this being regarded as a mark of high quality and blood. The engraving represents a mare of the highest quality.

3. **THE SUFFOLK PUNCH.**—Only three breeds of English draft-horses have gained celebrity in America. Of these, two have been already mentioned. There is, therefore, one more English draft-horse that calls for notice in this connection. It is the Suffolk Punch. This is a compactly built, short-limbed horse, as a rule, of great muscular conformation, looking rather light-boned, some specimens being imperfect in the feet. In some parts of England they are regarded with favor, but comparatively few have been imported to America.

IV. French Horses.—1. **THE PERCHERON.**—Whatever be the origin of what is now known as the Percheron horse, there is little doubt that he is descended from Oriental blood. In fact, it is a matter of history that when the Saracens invaded France, and were overthrown by Charles Martel, with great slaughter, the camp equipage, the cavalry horses, and the various other spoils of this barbarian host of 300,000 men fell into the hands of the victors. This was in A. D. 752. The fine Arabs and Barb horses thus captured were carried to France, and

there bred upon the larger horses of that country. Upon the return of the Crusaders, other Oriental blood was introduced into the horses of France; subsequently, there



Percheron Horse, Brilliant.

were other infusions of Arab blood, and, as late as 1820, two Arab stallions, Godalphin and Gallipole, were imported and used under the direction of the French govern-

ment. The result of all this was the production, in La Perche, of horses from fifteen to sixteen hands high, weighing from 1,200 to 1,400 pounds, and strong and untiring on the inferior roads of that day. They were good for eight miles an hour, pulling the heavy diligences then in use, and attracted attention wherever seen. The French government and the people of France were naturally proud of these horses, and to-day the descendants are among the most active, docile, and able draft-horses in America.

The engraving of Brilliant, imported by Mr. M. Dunham, from a drawing by Rosa Bonheur, shows one of the best specimens of this famous breed. The characteristic color of the Percherons is dapple-gray, becoming lighter with age. They are, however, now bred of other colors, including black. In France, Brilliant gained high honors, and, in the United States, undeniably stands as one of the best examples of this famous breed of draft-horses.

2. THE FRENCH DRAFT-HORSE.—Another division of the French races of draft-horses is now known by the above specific designation. Originally, all the French draft-horses were known as Normans and Percherons; afterward many were known as Percheron-Normans; then the heavier horses were divided from the lighter horses of Perche and designated as Normans. Still later, they were known, as they are to-day, by the name of French Draft-Horses. They have a stud book of their own. This larger class of horses is said to have originated north of the River Seine, and, in common with the Percheron, its representatives owe their increased size to Flemish blood. They are among the most magnificent specimens of the equine race. Modified and refined by careful breeding and selection, they compare well in weight with the best examples of the great Belgian and the Boulonnais horses of France.



French Draft-Horse.

3. THE BOULONNAIS HORSE.—In relation to this breed, we append the translation of the special committee of the Illinois State Board of Agriculture, from the introduction of the "Boulonnais Stud Book," which is as follows:

The Boulonnais district in ancient France was part of the country of Picardy, in the North of France, between the rivers Ada on the north and Canche on the south. This district is about sixty kilometers long and thirty wide.

The peculiar nature of its soil, rugged and hilly, for a long period made intercourse with neighboring districts difficult and rare. This fact has had great influence upon the local manners and habits of the people, which have been preserved unchanged for many years; and it explains the fixity of breeds, which have remained for centuries without mixing with other races.

This district of Boulonnais has for a very long time been a center of production from which young colts are obtained and taken to neighboring districts, such as Picardy and Normandy. Very often, after leaving their native districts, these colts lose their real name and are called by the Paris dealers after the districts in which they were raised, "Cauchois," or "Augeron" horses.

The example given by the most important breeding districts in England and in France, of establishing stud books, is now being followed by the Boulonnais breeders. The Boulonnais is universally recognized as a well-defined breed, having distinct features and remarkable characteristics peculiar to it; and it therefore has the right to possess a stud book.

4. COACH-HORSES.—There are but two breeds of horses that may be distinctively classed as coach-horses. These are the Cleveland Bays of England and what are now known as the French Coach-Horses. Both are active, stylish, compact horses, the best of each breed making the finest coach-horses, while those that are somewhat inferior prove most valuable for express and other city teams, where style is desired rather than heavy draft.

The Cleveland Bay was formerly held in high repute in England, but the breed was allowed to lapse. As regenerated to-day, he is stylish, and probably a better horse



Cleveland Bay Horse.

than the Cleveland of the last century, containing, as he does, a considerable infusion of thorough-blood.

The French Coach-Horse, like the Cleveland Bay, owes his style and muscular activity to the blood of the English thoroughbred. The breeding has been under the distinct patronage of the Government of France, and the outcome

is a horse, high-stepping, muscular, and stylish, sixteen hands, and over, in height; the peer, probably, of any horse in the world for the purpose for which he is intended. It



French Coach-Horse.

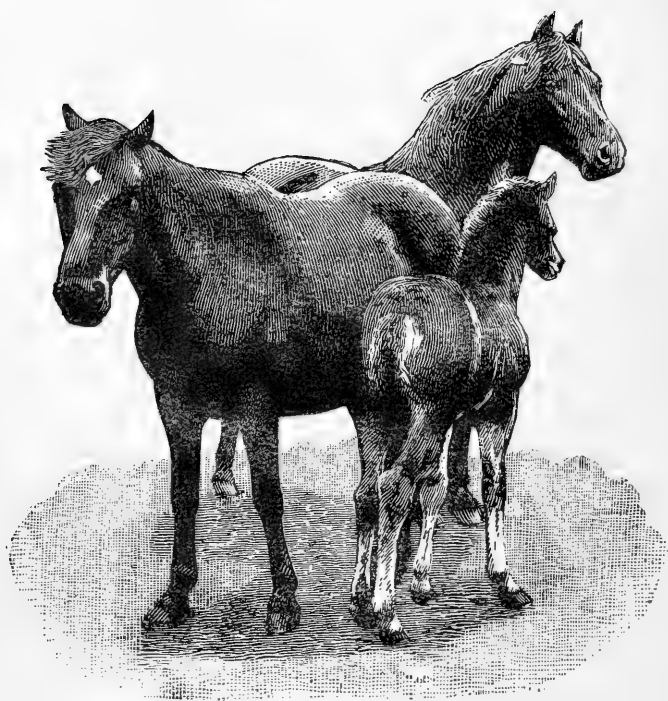
has been said that the locomotive drove the Cleveland Bay out of existence; be that as it may, the wealth of more modern times has demanded stylish horses for the family coach. The demand has been met in the modern Cleveland Bay and the modern French Coach-Horse.

PART III.

PONIES, ASSES, AND MULES.

I. Ponies.—Any undersized horse that is compact and muscular is termed a pony-horse; but there are ponies that are so termed distinctively. All northern countries have pony-horses. The mustang, the Canadian, the Indian horses, the Shetland, the Iceland, and the Exmoor (English) are all individual types. The characteristics of the Exmoor are presented in the illustration. Many of the more diminutive are now bred very fine, to meet the demands of wealthy persons who desire these little animals for their children. One of the most famous for courage, speed, going long journeys, and exhibiting wonderful endurance on hard fare is, without doubt, the Canadian pony, now, unfortunately, seldom found in his old-time form; but the late William Henry Herbert (Frank Forrester) has made it easy for us to judge what he was like fifty years ago, when he says that the thoroughbred Canadian horse is a perfect model, on a small scale, of the Percheron horse. The Canadian pony is a degenerate Canadian, if, indeed, the smaller pony, hardened by exposure, may be so-called—degenerate. Sagacious, honest, enduring, and capable of driving forty to fifty miles, day in and day out, over the roughest of roads and corduroy-bridges.

II. Asses and Mules.—From time immemorial the ass has been used, and was probably one of the first burden-bearing animals to be domesticated. After the domestication of the horse, the mule—a hybrid between



Exmoor (English) Ponies and Foal.

the ass and mare—was used for the saddle, the horse being reserved for war. The ass is more essentially an animal for hot, arid climates, and the mule less adapted to cold climates than is the horse; hence, we find the mule in increasing numbers, and more at home, as we go south, and correspondingly rare as we reach rigorous winter climates.

While the mule, as a worker, is more patient than the horse, he is more timid at the sight of unfamiliar objects. Another peculiarity of mules is, that they must become accustomed to a change of work before they will take kindly to it. By virtue of their patience, they are entirely tractable in the cultivation of crops, for instance, and less liable to do damage with the feet. When treated kindly, but firmly, they are in nowise dangerous to the driver; in fact, their liability to kick at strangers is due more to timidity than to any other cause. As to breeding, that question will be taken up under the head of "Care and Management."

PART IV.

HYGIENE, CARE, AND MANAGEMENT.

I. Stable Drainage.—In its relation to hygiene, the subject of stable drainage is among the most important, and this, too, apart from ventilation, a subject of equal importance; for, without proper ventilation, no system of drainage will avail much. The average architect of barns and stables too often leaves the above factors out of his plans and calculations; hence, it is absolutely necessary that the breeder should understand the principles of drainage and ventilation, in order that he may be able to give advice, and also to correct errors when found. For want of this knowledge, the proper hygienic effects can not be produced; neither can sanitary measures be fully carried out. In the case of all animals kept in confinement, whether in health or disease, drainage and ventilation may, in fact, be called ground rules.

In city stables, it is of the first importance. City horses, as a rule, seldom breathe perfectly pure air, unless they are taken out for labor or exercise; yet no other animals under our care require so much air, and that of absolute purity. Furthermore, the horse is the animal that must necessarily come oftenest under the care of the owner, one reason therefor being that he is the most valuable of our domestic animals; another and more general cause is to be found in the purely artificial conditions under which the horse is kept, and the exhausting nature of the labor required of him.

Stable drainage is most intimately related to hygiene in stable management, and it is also one of the most valuable auxiliaries in the assistance it renders ventilation in keeping the air pure. Much may be accomplished by strict attention to the regular and thorough cleaning of stables. It is only half performed when manure is dumped outside and allowed to accumulate, heat, rot, and poison the air with its fumes. It is still worse if the liquid matter of the stable be allowed to soak the floors, drip through and saturate the earth below, and become putrescent, thus giving rise to the most deadly germs.

A substance perfectly dry does not change; neither does a substance when frozen solid; but these conditions can not be practically reached. It is under the influence of heat and moisture that organic substances decay. Place any moist vegetable substance in a compact heap; in a short time heat ensues, and fermentation is followed by decay. During this process, the gaseous elements are set free, and at length nothing remains but charcoal, or the ashes, for the process of decay is simply combustion through the absorption of oxygen by the mass consumed. The same operation is as surely going on, but more slowly, in the forest, although it may take a hundred years to decompose a fallen oak. It is going on all about us in marshes and other places where vegetation is rife or accumulates. It is not perceptibly felt, for the reason that it is constantly being dissipated in that great reservoir of fertility and reconstruction—the air. It is only in confined situations that the emanations become inimical to health, and even deadly to the system.

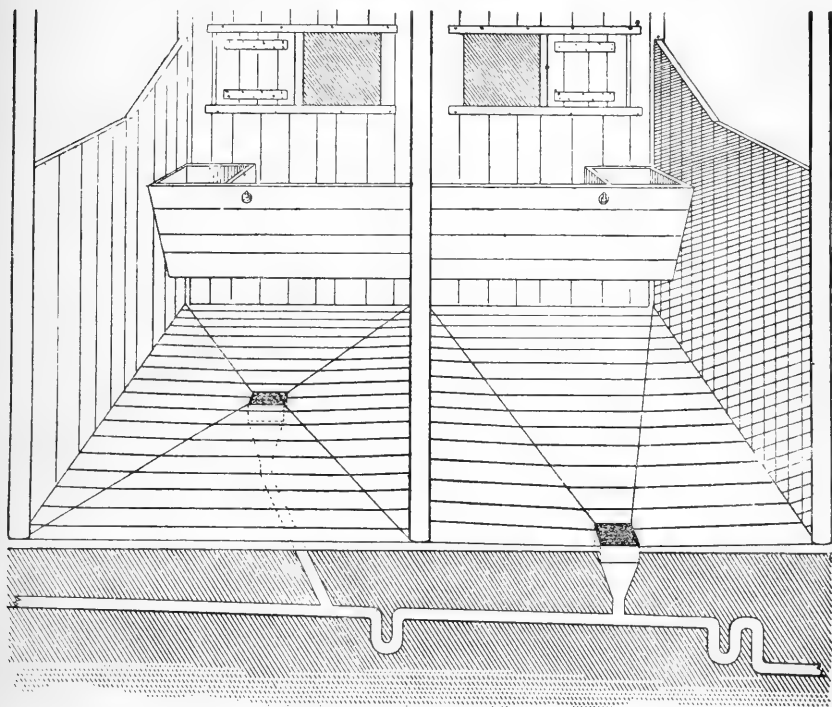
Let us take one phase of earth saturation and its effects from want of stable and house drainage.

At first there is little difficulty. Earth is an absorber, and fast holder, to a certain degree, of liquid and gaseous

emanations when dry. When saturated with moisture to the drainage point, they are passed along with the water of drainage until an outlet is reached—a well, spring, or stream—which is contaminated to a degree in accordance with the quantity discharged. Here is the secret of the contamination of city wells by house and stable drainage, from the want of sewage, or from imperfect sewage. Where there is no drainage to stables, therefore, dry earth forms not only a cheap, but valuable absorbent; and a peculiarity of earth absorption is, that saturated and again dried, its power of holding deleterious matter returns; so that the same earth may be used over and over again until its maximum capacity of holding other matters is reached. A few figures will show the relative powers of absorption of various earths, and hence will be valuable as showing also their relative power to hold organic matter.

According to the experiments of Shubler, it has been found that 100 pounds of dry sand will hold by attraction, or take up, 25 pounds, or one-fourth of its weight in water; a loamy soil, 40 pounds; a clay loam, 50 pounds, and pure clay, 70 pounds of water. Hence, it is readily seen how small a quantity of pulverized dry clay is necessary to absorb the daily evacuations of liquid excrement in the stable. The horse, for instance, passes a large amount by invisible perspiration, voids relatively little as urine—an average of about three gallons daily. Hence, here is shown a simple means, in the country, of getting rid of the liquid excrement, and at the same time of saving for manure the most valuable portion. In the case of sick animals, this means is no less valuable, where the patient, as it should be, is kept in a box-stall. The next best means is the absorption of the liquids by means of straw—oat-straw being the best, for, being soft, it absorbs moisture more quickly than wheat or rye straw. Dry sawdust, when it may be obtained, is also of much value.

II. Ventilation and Bedding.—One thing should be constantly impressed upon farmers—the value, and economy as well, of plenty of bedding for animals. The plea of scarcity of material can not for a moment be



Illustrating Stable Drainage in Cities.

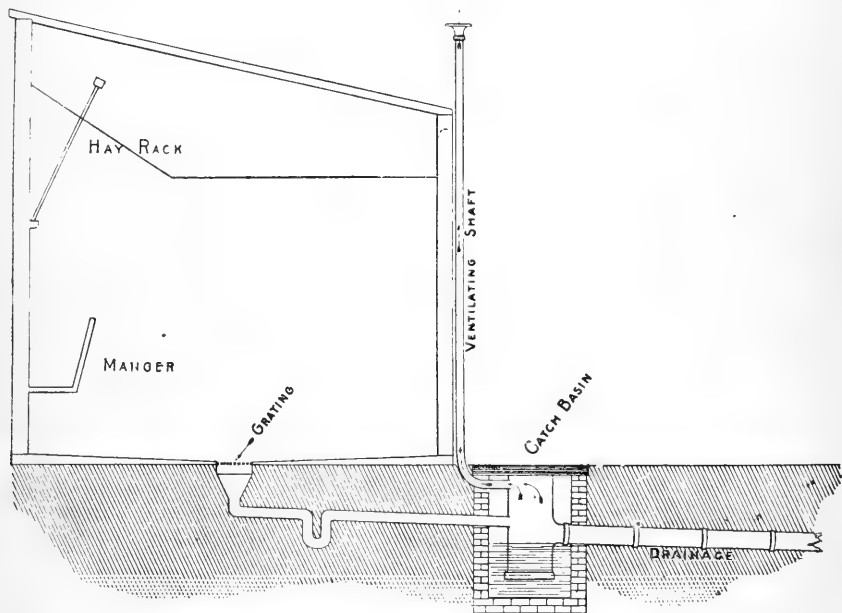
admitted. No more bedding is daily soiled when the animal has plenty than when there is little. This is evident at a glance to the individual who gives the matter attentive thought. Besides, if bedding material is really scarce on the farm, the soiled straw may be dried and reused.

We come now to the subject of drainage in its relation to the welfare of animals, both in health and sickness. There are numerous disabilities arising from want of drainage, and the constant saturation of wooden and earth floors with the liquid excrement of animals. In drainage, the first necessity naturally is, that the stalls must be arranged with reference to whether the animal be male or female. In the case of males, the lowest part of the stall must be between the fore and hind feet. In the case of female animals, it must be just at the rear. For horses, the floor of the stall may be cut across, midway from the point where the fore and hind feet rest, with a shallow groove, say four inches wide, and descending from the sides to the center, when it ends in a grating fine enough to prevent the escape of the bedding, etc. Here it falls into a pipe running under each stall and connecting with each, having inclination sufficient to carry away the moisture quickly and emptying on the open ground, as far away as possible from the stable; nevertheless, it is worse than folly to adopt a system of underground stable drainage unless there is an abundance of water for flushing the pipes. In the country, this is difficult to obtain; hence, sewage drainage is not practiced except in cities having public water works. The illustrations will show the idea we wish to convey. One of these represents stalls arranged for gelding and for mare as to position for gathering the liquid. Neglect often arises from the idea generally entertained that stable emanations are not inimical to human beings. It is, however, a serious annoyance, as must be all disagreeable odors, and then it is very injurious to carriages, affecting the varnish as well as impregnating the cushions with a subtle odor, and eventually rotting them.

When stable drains can be attached to a regular sewerage system, or be run into a properly ventilated wasting cess-

pool, there is little or no trouble about vapors and odors; but where the liquid has to drain into a close cesspool, considerable thought and ingenuity are required.

It need hardly be told that stables ought not to be drained into the same cesspool as is the house sewage. As there is only liquid matter to be dealt with, only one cess-



Stable Drainage, Catch-basin and Ventilator.

pool is necessary; but this one, to be complete, should be fitted with a movable pump and an air-shaft ventilation. All the drains must be made water-tight with cement, and the air-shafts should be made of cast-iron pipe not less than two inches caliber, and four inches is better. Zinc corrodes rapidly when used about the stable.

The illustration, which explains itself, shows an arrangement of a drain from a stable with ventilation of the catch-pit that will prevent all foul odors. It is a plan largely adopted in London.

III. Hygiene and the Stable.—In the drainage of soil for agricultural purposes, a very slight descent suffices to carry water. Round tile should always be used, and a fall of not less than eight inches in 100 feet secured, for the drainage of stables.

Where the drainage is not sufficient, or where there is no drainage, such means must be employed as may best counteract the evils as they present themselves. Among these should be the most thorough cleansing possible, and the use of deodorizing and disinfectant agents, as the case may seem to require; for the means to be used will, of course, depend upon whether putridity has occasioned deadly gases or not. An examination, therefore, of some of the many substances used for one or the other purpose will not be out of place here.

Deodorization is the driving away, covering up, or removal of disagreeable or noxious odors. A disinfectant is an agent capable of neutralizing morbid effluvia, or the cause of infection. It must be borne carefully in mind that the destruction or covering of odors is not necessarily disinfection. In fact, deodorizing, as generally used, is often the replacing of one odor by another, as in the case of burnt sugar, vinegar, chloride of lime, carbolic acid, etc. The two latter are really disinfectants. Neither are unpleasant odors, necessarily detrimental to health. So, also, an infectious atmosphere may present to the senses little or no cause of alarm. In fact, the most deadly typhoid germs may be present in the water we drink. It is clear and bright to the eye; the sense of smell can

detect no odor; to the taste it is perfect, and it will sparkle in the glass like the purest spring-water, yet may be deadly to drink. Simple odors may not be noxious; animal odors are not so unless one is confined in their atmosphere; but when they are disorganized and putrefy, they are always dangerous. Here, again, let it be reiterated: In stables the danger is not from the fresh evacuation of healthy animals, but from their continued putrefaction in and of the substance saturated with them.

So far as simple deodorization is concerned, there is no better agent, easily attainable, than dry pulverized clay, or strong clay loam. Charred sawdust, or pulverized charcoal, is also one of the best, but difficult to obtain. These are chiefly valuable from their absorptive qualities. Pulverized gypsum is another cheap and valuable absorbent; and gypsum acts mechanically, and also chemically. That is to say, 100 pounds of gypsum (unburned) will fix or form sulphate with nearly twenty pounds of ammonia, and thus sulphate of ammonia, and, of course, carbonate of lime, is formed. Hence its value in preventing the fumes of ammonia from escaping in any manner, as horse manure, for instance, containing it. Gypsum is also decomposed by carbonate and muriate of barytes, the carbonates of strontia, potash, soda, and of ammonia; and also by oxalic and humic acid. Hence, it may be applied freely when any of these substances are suspected. For drains, cesspools, or any confined place that gives off the smell of rotten eggs (sulphureted hydrogen), copperas, in fine powder, will be indicated, both on account of its cheapness and certainty of action. Chloride of lime and carbolic acid in solution may also be indicated when their odor will not be objectionable. To detect whether the air is pure or impure, dampen a white linen cloth in a solution of nitrate of lead, and hang it in the suspected atmosphere. If the

cloth does not become discolored, the air may be considered pure. To disinfect drinking-water, Condie's preparation will be indicated. This is composed of crude permanganate of potash in the proportion of half an ounce to half a pint of water. A teaspoonful to a barrel of water will sweeten it, and if it is continued to be added until a faint tinge of color is exhibited, all injurious organic matter will be destroyed. To disinfect a room, put a few teaspoonfuls in the apartment, and renew as often as the solution loses its color. The quantity will be indicated by the size of the apartment.

For ordinary use, the following articles stand in relation as given, chloride of lime in combination with sulphuric acid standing as 100:

Chloride of lime with sulphuric acid.	100.0
Chloride of lime with sulphate of iron (copperas).	99.0
Carbolic acid (disinfecting powder).	85.6
Slacked lime.	84.6
Alum.	80.4
Sulphate of iron (copperas).	76.7
Chloralum.	74.0
Sulphate of magnesia ..	57.1
Permanganate of potash with sulphuric acid.	51.3

IV. Some Causes of Contagion.—Major-General Sir F. Fitzwygram, Bart., is one of the latest and best English authorities on stable management. Here is what he says on the subject:

When a particular disease runs through a stable, it does not by any means follow that it has been introduced or spread by infection or contagion. On the contrary, faulty stable accommodation, or bad ventilation, or bad drainage, or neglect, either collectively or sometimes even singly, are often sufficient to develop wide-spread disease among all the animals subject to the same cause or causes.

When a disease breaks out suddenly in a stable, and several animals are attacked at once, it usually depends

on their all being subjected to the same noxious influence. The causes, whatever they may be, usually affect first those animals which are weak and predisposed to disease of any sort; afterward those which are less predisposed, and ultimately may affect all in the stable. The disease is then said to be, and is by many believed to be, infectious or contagious.

The earlier cases in any such attack do not in general arise either from infection or contagion. It must, however, be borne in mind that the vitiated atmosphere produced by the exhalations and secretions of a number of diseased bodies congregated in a badly ventilated place, intensify the original cause and lead to the further reproduction of the disease.

The prevalent ideas regarding infection and contagion, though under certain circumstances true, are, nevertheless, the source of much mischief; because these agents are often accepted as the adequate and irresistible cause of disease, and, therefore, no due or sufficiently careful search is made for the real and active source.

Very few cases of disease, either in man or animals, are, under good sanitary arrangements, transmitted by infection or contagion. Certain predisposing conditions are required to enable the poison, whatever it may be, to take effect. It requires, for instance, a certain proximity of the patient; a confined, unchanged atmosphere, and, as a general rule, a delicate, ailing, susceptible subject. If these conditions are wanting, diseases seldom spread from one animal to another.

Many complaints, however, which, in a clean, well-aired and well-drained, and not overcrowded stable, are quite unable to propagate themselves, become infectious or contagious under less favorable circumstances. The emanations from the sick hang thick and noisome in a foul, close, unchanged atmosphere, and by concentration and ferment acquire a positive power of disturbing health and reproducing disease.

V. The Care of the Stable.—In country stables, there is no excuse for foul odors. Build your stable perfectly tight, but with apertures that may be opened or closed

at will for the admission of air. The temperature of stables in their relation to health is worthy of consideration. The proper temperature is undoubtedly from sixty to sixty-five degrees. If it is possible, the stable should never go much below the freezing-point. The reason is obvious. It occasions severe loss of vital heat that must be supplied in some way. If the body becomes chilled, many functions are impaired, digestion especially. Bronchial affections, chronic coughs, pneumonia, and many inflammatory diseases are apt to arise. If to this is added vitiated air, the most serious consequences may arise from blood-poisoning, for it is while the animal is in an enforced state of quiescence that complications occur. Exercise promotes heat, full inflation of the lungs, and the system is enabled to throw off morbid action, and excretion is active. If these disabilities need care to guard against them in health, how much more necessary in actual disease !

In thus outlining something of the effects of proper ventilation in its hygienic effects, and the absolute necessity of plenty of fresh air, and its careful distribution and equable dispersion to prevent drafts or direct impingement on any part of the body, we have done all that may be deemed necessary. There is one thing more, however, to which attention may here be directed. We refer to the conservation of heat, and particularly for its value in all country districts. The hair is given to the animal both as a protection against the sun of summer and the cold of winter. The action of sunlight is a cumulative one; that is, any substance which, taking in its rays will accumulate heat far greater than the normal force. Take a glass-covered surface, for instance. All rays pass freely through it, but heat is given back feebly, hence the confined surface soon becomes intensely heated. The hair of animals is a poor conductor of heat. Hence, the rays of the sun have comparatively slight effect

on the body. In the winter the coat becomes long, and the heat of the body is entangled within the hair, and the animal constantly carries this bodily heat around with it in a still atmosphere; hence the reason why we are little susceptible to the influence of cold in a still atmosphere, however severe. Let the wind commence blowing, how quick the change! The heat of the body is blown away; and if this is accomplished faster than the system can furnish heat, first a chill ensues, then stupor, and the animal or man certainly succumbs unless shelter is reached. Hence the absolute necessity of shelter to bring about the best hygienic results to our domestic animals.

In the treatment of diseased animals, the subject of ventilation and drainage becomes of the first importance; for unless proper hygienic conditions are present, we can not successfully combat disease.

VI. Stable Ventilation.—The ventilation of a stable may be effected by windows on the sides. It must be remembered, however, that abnormal exposure to light causes distress to the eyes, or one of them, and this induces disease and blindness. It is, however, only strong light that has this effect. A north light, which is diffused and has no bright sun-rays, has very little or no injurious effect in any way, and horses may quite safely stand in the full light with windows directly in front of them. A great deal of trouble is caused by dark stables, in which the horses stand in a sort of a twilight, or at times almost complete darkness, from which they are brought out into bright sunshine. This is painful and injurious to the eyes, and no doubt its constant repetition day after day will end in ophthalmia and the very common periodical disease of so-called moon-blindness, and finally complete blindness. If the windows must be necessarily exposed to the sunlight, it is desirable,

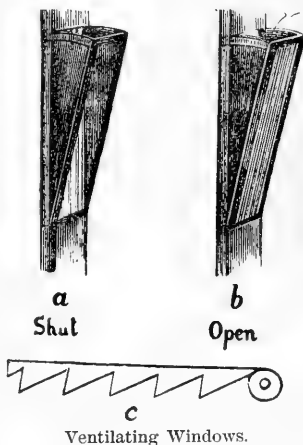
perhaps, to shade the light in some way, that a horse may not stand in the full glare of it. This may be done by covering the glass with white paint, daubed on with the stiff ends of the hairs of a brush, so as to give the effect of ground glass; or cover them with thick lime-wash in the same way. As a rule, stables for both cows and horses should be light and airy. Light encourages cleanliness, for it exposes dirt and filth, and makes a man ashamed of himself. The only precaution needed is to prevent the sun's rays from shining directly into the faces of the horses, and what is worse, into the stalls sidewise, so as to excite one of the eyes only. One way to provide this is:

The sides are of pine lumber, twenty-six inches long, and one foot wide at the broad end, tapering to an inch wide at the other end. The wider ends are cut to a segment, somewhat as on page 45. Quarter-inch holes are bored in the edge of one of these boards. A sash eighteen by twenty-six inches, with four lights of glass, is screwed to the front edges of the boards. The whole is then hung in place by a pair of butts, screwed to the lower side of the sash and to a board firmly nailed to the inside of the stable, in the rear of a stall. A flat piece of iron, with a quarter-inch hole, or a stout screw-eye, is fastened into the stable wall directly over one of the side boards. Through this an iron pin is thrust into a hole in the edge of the side board, to hold the ventilator at any desired angle. When open, of course, a current of air is admitted, ventilating the stable without exposing the horse to a direct draught.

A better way, however, is described by "Stonehenge," as follows:

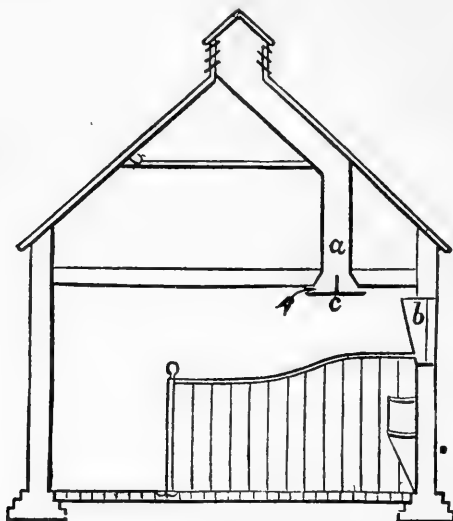
All stable windows should be of iron, and if they are cast with iron bars six inches apart from center to center, no horse will break the glass. Every other bar may be made to project so as to form the framework for

the glass, and in this way serve a double purpose. In building new stables, I should always prefer to place the windows close to the ceiling and above the mangers, so as to give the horse the fresh air where he wants it. If they are made to open in a valvular form, as represented below, on the same principle as has long been adopted in church windows, and as I have for years recommended for lighting and ventilating kennels, there is no down-draught, and every advantage is obtained from the fresh air without the disadvantage which ensues when it blows down upon the back or loins. In the engraving, (*a*) represents the window perfectly closed, in the state admitting light but no air; (*b*) shows the same window opened as far as the framework will allow, intermediate degrees being regulated by the ratched rod (*c*), which is fixed to the upper edge of the frame, and catches on the top rail of the sash. Iron frames of this shape may be obtained by order of any iron-founder, or they may be made of wood. The glass must be guarded with bars, either fixed to the sashes themselves or to the framework. It will be seen in the figure (*b*) that I have indicated with an arrow the direction which the air inevitably takes as it enters the stable. Of course these windows may be fixed in any wall other than that at the head of the horse, but I prefer the latter as being the nearest to the nostrils, where the air is wanted for the purpose of respiration. The size should be about two feet square. The additional cost is very trifling when it is considered that no other openings need be provided for the admission of air.



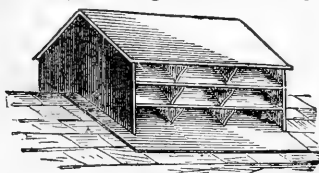
Having thus provided for the admission of fresh atmospheric air, the next thing to do is to carry it off, when it has been used for the purposes of respiration. It is not safe to depend upon the wind for this purpose; and the only remain-

ing agent is the diminution in its specific gravity when air is warmed by respiration. By taking advantage of this principle, the foul air is carried off from the upper parts of



Ventilating Shaft.

the stable if a shaft is fixed there for its passage. Sometimes a small shaft is introduced over the head of each horse; but in practice it is found that one large shaft, a foot square or more, will purify a stable containing four or five horses. It is better to fix this about the middle of the stable, as regards its length, but near the heads of the



Covered Head of Shaft.

horses, as shown in the section of a stalled stable. The tube may be made of wood, because it does not condense the steam as it ascends nearly so much as metal, and there is less dropping of water from it. The upper end of this shaft should be guarded from down-draughts, either by a cowl which will turn with the wind, or by a covered ventilator on the ridge of the roof.

Some years ago, in a work entitled "The Farmer's Stock Book," the writer summed up the matter as follows: "The arrangement of stables is important. The horse-stalls should be ample and have every appliance for convenience possible. The partitions should be of the most substantial character, and the pavement solid and of such material that it will not absorb urine. The harness-room should be as near the stables as possible, and at the same time in a separate room. There should be enough box-stalls, twelve feet square, to accommodate the sick horses and the mares at foaling-time. We advocate that horses be made as companionable as possible; that is, they should have a full view of each other and a chance to get their noses together, except in the case of vicious ones, or those inclined to be quarrelsome. These must be kept in stalls of the most solid description, with high walls and bars behind to prevent them from doing damage if they get loose. The reason why horses should be able to see about them is, there is nothing that will tend sooner to make an intelligent animal vicious and dangerous than solitary confinement. It will render men desperate. Even the dog kept chained is well known for his unreasoning ferocity."

PART V.

FEEDING AND GROOMING.

I. The Care of the Horse.—It is worthy of remark, that in the feeding and grooming of horses lies the essence of good management; for good work here is the keynote of excellence in all care pertaining to the horse.

The writer of this has gained much information, in years past, from a study of Youatt, who, in England, was one of the great lights in veterinary practice in the early part of the century.

Youatt's observations, as commented on by Herbert, will pretty nearly "fill the bill." We therefore quote his remarks in the next department of our subject.

II. Grooming.—This authority says: "Much need not be said to the agriculturist, since custom, and apparently without ill-effect, has allotted so little of the comb and brush to the farmer's horse. The animal that is worked all day and turned out at night, requires little more to be done to him than to have the dirt brushed off his limbs. Regular grooming, by rendering his skin more sensible to the alteration of temperature and the inclemency of the weather, would be prejudicial. The horse that is altogether turned out needs no grooming. The dandruff, or scruff, which accumulates at the roots of the hair is a provision of nature to defend him from the wind and the cold."

This, however, which may be true and correct as of the horse which is turned out every night during the greater part of the year, and which feeds only on grass,

with some slight addition of oats and mashes, certainly is not applicable to the farm-horses of the United States, which are, for the most part, if not altogether, stabled for the greater part of the year, or in winter, at least; fed on artificial food; kept warm, to a certain extent; and which, of course, must be cleaned daily, especially after severe work or exposure to wet, if they are to be kept in health and working condition.

"It is to the stabled horse," Youatt continues, "highly fed, and little or irregularly worked, that grooming is of the highest consequence. Good rubbing with the brush, or the curry-comb, opens the pores of the skin, circulates the blood to the extremities of the body, produces free and healthy perspiration, and stands in the room of exercise. No horse will carry a fine coat without either unnatural heat or dressing. They both effect the same purpose, but the first does it at the expense of health and strength, while the second, at the same time that it produces a glow on the skin, and a determination of the blood to it, rouses all the energies of the frame. It would be well for the proprietor of the horse if he were to insist and to see that his orders are really obeyed; that the fine coat in which he and his groom so much delight is produced by honest rubbing, and not by a heated stable and thick clothing, and, most of all, not by stimulating or injurious spices. The horse should be regularly dressed every day, in addition to the grooming that is necessary after work."

It is true, in a measure, that the necessity of regular dressing, wispings, currying, brushing, and hard rubbing is far greater in the case of highly pampered horses, fed in the most stimulating manner, principally on grain, kept in hot stables, always a little above their work, and ready at all times to jump out of their skins from the exuberance

of their animal spirit; yet it is necessary to all housed and stabled horses; and the farmer, no less than the owner of fast trotters, will find his advantage in having his horse curried and washed before feeding in the morning, in the increased play of his spirit, and in the gayety and fitness of the animal for his work; and if, when he brings him in at night, reeking with sweat, drenched with rain or snow, his thighs and belly plastered with thick mud, and his legs covered, as cart-horses' legs mostly are, with thick hair, saturated with cold water and clogged with particles of mud and sand, he neglects to have him thoroughly cleaned, and made dry and comfortable for the night, he not only commits an act of gross cruelty, but wholly disregards his own interest. Unless a horse be cleaned and groomed when in such a condition, he can not be kept in health; and if he be fed freely when in such a state—although the cart-horse is less liable to such ailments, from his hardier habits and less impressive constitution—the chances are that soon he will be attacked by inflammation of the bowels, or lungs, or with spasmodic colic—the race-horse, fast trotter, or highly bred and highly fed roadster would be so attacked to a certainty—and the failure to dry and cleanse the legs of such a horse, especially if there be a draft of cold wind blowing upon the heels from a crevice under the stable door, as is generally the case in common farm stables, will be almost certainly succeeded by that troublesome, dangerous, and foul disease known as “grease,” or more commonly in the United States and Canada as “the scratches.”

III. Stable Temperature and Clothing.—It may be well to reiterate: the best average heat for a stable should be from sixty to not to exceed sixty-five degrees; that the air should be normally dry; for if there be any

moisture about the stables, it will hang about the horses in the shape of a mist, and the animals when they are brought into the open air, although their skins will be as fine as can be imagined, will shiver as if they had just made their exit from a warm bath.

Herbert's advice is that a single good blanket, breast-plate, and roller will be a sufficient clothing, though a Holland sheet under the woolen rug is very serviceable in keeping the skin smooth and the coat unruffled. A hood and cover should be added when the horse is taken out for slow exercise. It is common in America in winter, in unusually cold weather, where horses are expected to be driven fast and to have to stand still alternately at shop doors or in visiting, to see them clothed, under their harness, in hoods and blankets. This plan can evidently do no good; the animal, while working fast, is as much more heated by the covering as he is afterward more protected by it when standing still; add to which, if the clothing be, as probably it will, saturated with perspiration while the animal is in motion, it will be frozen or rendered entirely cold and clammy so soon as the motion ceases, and will, in that state, affect the animal injuriously instead of beneficially; just as it would affect a man to wrap him up, when sweating profusely, in a heavy, wet overcoat. If anything of this sort be required, the only rational way is to have the blankets at hand, throw them over the backs of the animals and buckle them across their chests so soon as they are pulled up, removing them and restoring them to a dry place before again getting under way. Such is the rationale of out-door clothing. There is, however, no objection to the use of a water-proof covering over the loins of a horse when he is taken out to be used through the whole of a cold, rainy, or sleety day, if the team is to be used at an even, moderate gait.

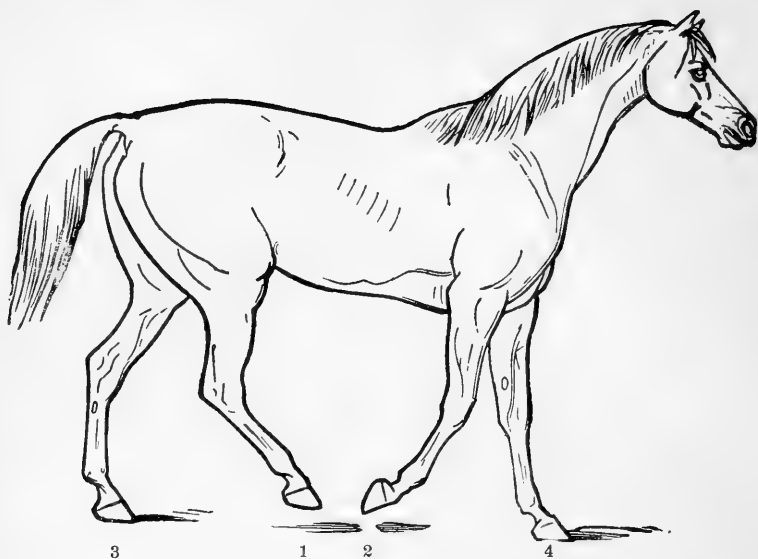
To return to the article on grooming: "When the weather will permit the horse," continues Mr. Youatt, "to be taken out, he should never be groomed in the stable, unless he be an animal of peculiar value, or placed for a time under peculiar circumstances. Without dwelling on the want of cleanliness when the scurf and dust that are wasted from the horse lodge in his manger and mingle with his food, experience teaches that if the cold is not too great the animal is braced and invigorated, to a degree that can not be attained in the stable, by being dressed in the open air. There is no necessity, however, for half the punishment which many a groom inflicts upon a horse in the act of cleaning, and particularly on one whose skin is thin and sensitive. The curry-comb should be at all times lightly applied. With many horses, its use may be almost dispensed with; and even the brush need not be so hard, or the points of the bristles so irregular as they often are. A soft brush, with a little more weight of the hand, will be equally effectual, and a great deal more pleasant to the horse. A hair-cloth, while it will seldom irritate or tease, will be almost sufficient with horses which have a thin skin and which have not been neglected. After all, it is no slight task to clean a horse as it ought to be done. It occupies no little time, and demands considerable patience, as well as dexterity. It will be readily ascertained whether a horse has been well dressed by rubbing him with one of the fingers. A greasy stain will detect the idleness of the groom. When, however, the horse is changing his coats, both the brush and the curry-comb should be used as lightly as possible."

IV. Finishing Touches.—In ordinary cleaning, in the morning, the head should be first cleaned. The hair should be lifted and loosened lightly—not pulled or torn

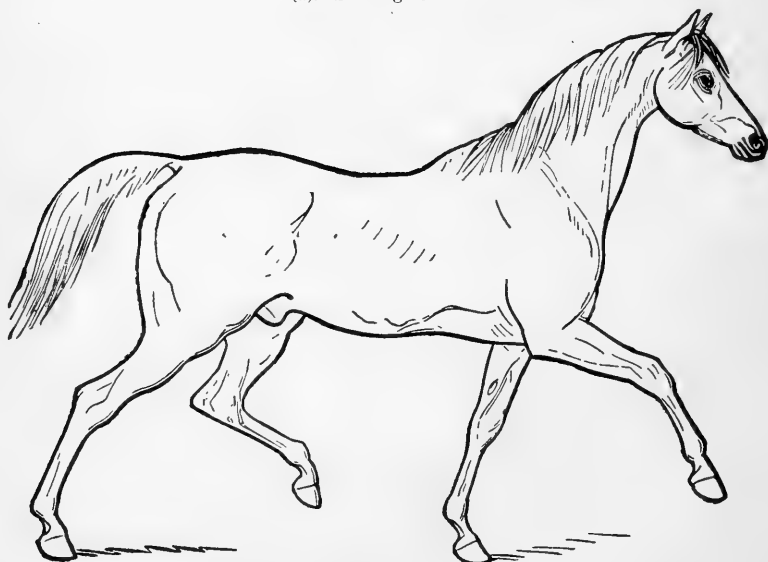
—with the curry-comb, and then rubbed well in all directions, both against and across the grain of the hair, as well as with it, until it is entirely clear from dust and dandruff. The ears should be gently pulled and stripped with the hand from the roots to the points; and the whole head should then be brushed smoothly and evenly as the hair ought to lie. The neck, back, shoulders, loins, croup, and quarters follow; the same plan being used, except that in dressing these parts, while the comb is used lightly and dexterously with one hand, the brush is employed in removing the scurf with the other. The flexures of the skin at the insertion of the limbs are parts which require especial care, as the dust is most apt to collect in these places. This done, the horse must be thoroughly wisped all over with bunches of dry straw, till his coat is quite clean and glossy, when it may be gone over for the last time with a fine, soft brush.

This being done, his clothes may be then put on, and the legs cleaned in the same manner, and finished off by a careful hand-rubbing. Flannel bandages, steeped in cold water, well wrung out, and applied loosely to the legs, and again covered by a tighter-drawn linen bandage, are often of great advantage, after severe work, in keeping down and checking inflammation, as well as in fortifying and strengthening the sinews when in a sound state, and in remedying and alleviating any slight slip or casual strain.

The way of cleaning when the horse is brought in wet, weary, hot, dirty, and exhausted, is nearly identical. The ears should be first stripped and pulled, and the head made comfortable. The dry dirt should be scraped from the legs and belly. The legs should be plunged into tepid water and have all the dirt washed carefully away; they should be then carefully dry-rubbed with wisps of clean straw, and tightly swathed in flannel bandages, steeped in water as warm as the hand will bear. The whole neck and



(a). Starting to Walk.



(b). Action in the True Trot.

body should then—or, if there be sufficient force of hands in the stable, at the same time while the legs are being arranged—be thoroughly rubbed, till perfectly clean, dry, and in a glow of vigorous animal heat, with straw wisps. After this they should be lightly curried, brushed, and arranged; and then, nor until then, the clothes may be put on, the animal fed, his stall well bedded and littered down, and himself left to his repose, which, however hard his day's work may have been, will, if these precautions be taken, be both soft and light.

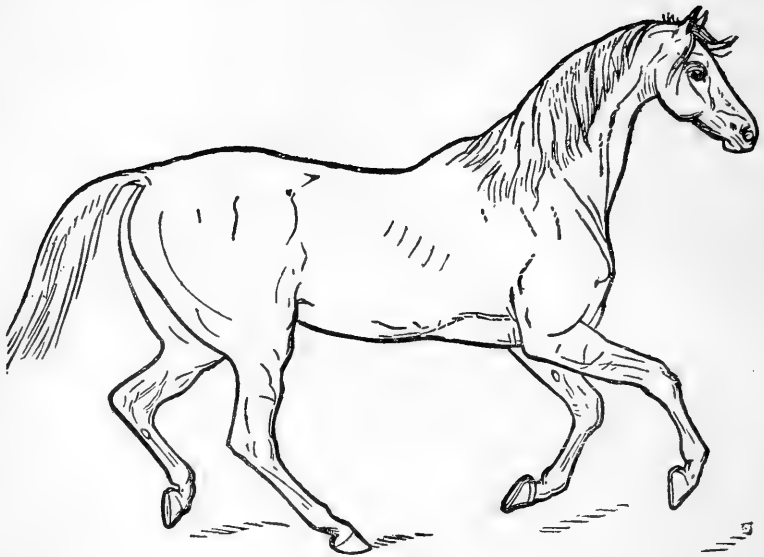
Now all this applies especially to horses that are kept for pleasure, or for fast work. It applies fully as well to such as the farmer expects to sell for these purposes. It is no less important, approximately, that care like this be given a team that has been given more than ordinarily severe labor.

V. Action of the Horse in Moving.—(a.) Outlines indicating positions of the horse in motion, after "Stonehenge." From the position of each limb, it will readily be seen from the figures how each of the feet are successively lifted, No. 4 being lifted last.

(b.) The action in the true trot, which is a true rhythmic motion regularly, 1, 2, 3, 4, is shown on page 54.

(c.) The next distinct gait is the canter. It is a thoroughly artificial pace, and very tiring to the animal, for to acquire this slow gallop the head must be raised and the animal thrown more or less on his haunches; and, as in walking, trotting, or galloping, the horse may be taught to lead with either fore foot, or to change as may be desired by the rider, thus resting both man and animal.

(d.) The next of the natural gaits is the gallop. The next illustration shows the correct view of this movement. This shows what is usually called a hand-gallop.



(c.) The Canter.



(d.) Correct View of the Gallop.

When the horse is at full speed, there is simply greater extension.

One other gait is a natural gait of the horse. It is the pace, where, instead of there being cross action in the motion of the feet, a fore and hind foot are simultaneously lifted alternately on each side of the body. This is the easiest gait of the horse for the rider, and on perfectly smooth ground easy to the horse, since the feet just clear the earth in moving; but where the horse is taught to trot and pace at will, together they are less fatiguing to the horse than any single gait.

With this, we leave the subject of feeding and grooming, having added the illustrations showing the action of the horse in the walk, trot, canter, and gallop, as being the four natural movements of this, the noblest of the servants of man. We have mentioned and described the methods by which the horse may be kept in the best possible condition. The farm-horse does not require this extreme care; but this book is not written for those who think the lee-side of a stack a fit place for the horse in winter. We are beginning to appreciate the fact that the best care is the cheapest care. The farmer may modify the plan we have given to suit his particular circumstances.

PART VI.

BONES, MUSCLES, ETC., OF THE HORSE.

I. Anatomy.—The anatomy of an animal under the care of man is worthy of close study. Anatomy has reference to the dissection of an organized body. The term is usually understood, however, as pertaining to the bony formation or skeleton. Comparative anatomy is the relation of one animal to another, so far as structure is concerned. With it we shall have to deal only in instituting a comparison between man and the horse. As regards the horse, nothing will be considered except the bones and the muscles. In order to elucidate these fully, we have had engraved, after an English delineator, Mr. B. Waterhouse Hawkins, F. L. S., F. G. S., accurate representations of the more important parts, and have likewise given the definitions, thus enabling the reader to get a correct scientific idea of the subject. In this connection, we shall follow the definitions laid down, translating them when important into common nomenclature.

II. Man and the Horse Compared.—In considering the skeleton, reference will be made to other engravings for a more critical study. In relation to Plate I, our authority says: "The bones comprising the skeleton may be divided into two groups, the first comprehending the head, neck, and backbone, with the ribs, sternum, and haunch-bones—in other words, the vertebral column and all those bones which are in immediate connection with it, together constituting the framework of the trunk; the

second group comprising the bones of the limbs or legs, divided into a double series of somewhat complicated articulations or joints, necessary for the safety of the animal under the manifold shocks and strains to which its varied and often violent action continually exposes it."

In Plate I is given a view of the entire skeleton of the horse, showing the various bones in their natural position and relation to one another. The head may, for descriptive purposes, be divided into two parts, the skull and the face, each having its own particular bones, whose relative size varies in some slight degree in the different breeds, and considerably affects the intelligent expression more or less to be observed in the face of every horse. These bones will be more particularly described in that portion of the book relating to the bones of the head and neck.

The bones composing the vertebral column are divided into five groups.

The *cervical* vertebræ (Pl. I, Neck; Pl. III, Fig. 2), or those of the neck, extending from the head to the ribs, are seven in number in the horse, as in all other mammalia. Eighteen are given to the back, and are called *dorsal* (Pl. I, 3); these are the only ones bearing the ribs. The third group contains six vertebræ, the *lumbar* (Pl. I, 4), or those of the loins, situated between those bearing the ribs and the haunch-bones. It should be borne in mind, however, that the number of ribs is sometimes found to exceed that stated above; nineteen, and occasionally twenty, ribs are found in the horse; but in such cases there is no actual increase in the number of bones in the vertebral column. The *dorsal* and the *lumbar* vertebræ together are always twenty-four, so that if one or two ribs above the normal number are present, thereby increasing the contents of the *dorsal* series, the *lumbar* vertebræ are proportionately reduced. The fourth (Pl. I, 5), the *sacral* (between the haunch and tail),

includes five bones, which are anchylosed or united together into one mass, and, thus joined, act as a kind of wedge or keystone to the arch formed by the approximation at this point of the haunch-bones. Great strength and solidity are required here, as the united bones of the haunch, or *pelvic arch*, as they are called by anatomists, are the great pivots on which the hinder limbs turn, and by which they are enabled to throw forward the whole weight of the animal. The remaining vertebræ are the *caudal*, or tail (Pl. I, 6), usually fifteen; they are, however, exceedingly subject to variations, to the extent of two or three above or below the above number mentioned.

To recapitulate, the normal contents of each series of vertebræ will stand thus:

Cervical, 7; Dorsal, 18; Lumbar, 6; Sacral, 5; Caudal, 15—total, 51.

The form of these bones varies considerably in the different parts of the vertebral column. It will be unnecessary, however, to describe them very minutely, as, except in the case of those of the back, their shape does not conspicuously affect that of the animal. The most prominent feature in each dorsal vertebra is the strong spinous process or projection on its upper surface. These processes are largely developed on the anterior portion of the dorsal series, and produce the elevation or prominence above the shoulder commonly called the withers. They are of considerable importance to the long-necked quadrupeds, from their affording a large surface for the attachment of the great ligament which supports the head and neck. All together they form the ridge of the back. On each other side of the dorsal vertebræ, transverse processes are situated, articulating with the ribs; and other smaller oblique projections serving to unite and fit one vertebra to that adjoining. The spinal column has considerable

flexibility, as well as very great strength; these essential qualities being due to pads of cartilage interposed between the several bones, and firmly united to them. Besides these, there are ligaments running along the broad under surface of the vertebræ; others, again, between the transverse processes, and similar strengthening ties uniting the upright projections or spinous processes, the whole mass forming a marvel of strength, lightness, and flexibility. The ribs (Pl. I, 7), eighteen in number, are joined to the transverse processes of the vertebræ, and curve, with some variations in their outline and direction, down toward the sternum, or breast-bone, to which the first seven or eight of them, called the true ribs—the number sometimes varying—are attached by their extremities, which, to provide the elasticity necessary for the expansion of the chest, are composed of cartilage. The remaining ribs are termed false ribs, as they have no individual connection with the breast-bone; they are, however, united together by cartilages, each on its own side, and this cartilaginous union ultimately terminates in the sternum; so that the whole of the ribs are enabled to expand or act in uniformity. The *sternum*, or breast-bone (Pl. I, 8), in the young horse consists of six bones, which become united into a single piece in a full-grown animal. The front of this bone is convex and sharply keeled, its upper extremity projecting so as to be easily observed in the living horse. This is known as the "point of the breast," and its place will be easily ascertained when it is remembered that the lowest part of the collar just covers it.

The haunch, or pelvis (Pl. I, 11; Pl. II), is in reality made up of six bones—three on each side—the whole firmly united into one. Of these, the *ilium* is the most important, and is strongly secured to the *sacral* vertebræ, which form the keystone of the pelvic arch. Lateral prolongations of

the *ilium* produce the prominences so conspicuous just above and in front of the hind-quarters in every horse. The *ischium*, or hip-bone, is a backward continuation of the *ilium*, and bears a considerable tuberosity, which projects on each side a little below the tail. The *pubis*, apparently a single bone, is connected with those already mentioned, and forms an inverted arch with them below (Pl. II, *d*).

The bones of the limbs next claim attention. The natural attitude of the horse being that of a quadruped supported on the extremities of its four limbs, and with its body in a horizontal position, there is a greater apparent difference between its skeleton and that of man than really exists, as will be evident after a very slight examination and comparison of the two series of bones composing them. Man rests on the entire length of the foot, and his hands and fingers are constructed for grasping. The horse, on the contrary, is supported on the extreme points of its toes and fingers, reduced on each limb to a single digit, and protected by the nail becoming modified into a hoof. The long-established phraseology of horsemen brought into use by the necessity for distinguishing the different parts of fore-legs and hind-legs, and the strange confusion resulting from the introduction of new names and the misapplication of old ones, render a due comprehension of the nature and relation of these limbs almost impossible to those who have given no attention to the skeleton of the horse.

Many of the bones in each skeleton are known by the same names, but some parts of the limbs in the horse have been strangely miscalled. Mr. Hawkins, therefore, has thought it desirable to give, in parallel columns, the names of those bones and joints which, although exactly corresponding in man and the horse, are spoken of under different titles in the ordinary description of the two skeletons.

References to the various illustrations will show the true relation and correspondence of the several bones; but as we shall have to speak specially of the horse, it will perhaps be desirable to employ the terms generally used in connection with that animal. They are as follows:

III. Corresponding Bones in Man and the Horse.—The names commonly applied to corresponding bones in man and the horse are: (See Plate II.)

MAN.		HORSE.
	<i>Front Limbs.</i>	
Arm (<i>humerus</i>)	=	Lower bone of shoulder.
Fore-arm	=	Arm.
Wrist (<i>carpus</i>)	=	Knee.
Hand (<i>metacarpus</i>)	=	Leg, cannon, and splints.
Knuckles	=	Fetlock.
Finger	=	Pasterns and foot.
	<i>Hind Limbs.</i>	
Thigh (<i>femur</i>)	=	Upper bone of thigh.
Knee	=	Stifle-joint.
Leg	=	Thigh.
Ankle (<i>tarsus</i>)	=	Hock.
Heel	=	Point of hock.
Foot (<i>metatarsus</i>)	=	Leg.
Ball of foot	=	Fetlock.
Toe	=	Pasterns and foot.

The fore-leg, or front limb, is united to the body of the horse by means of the shoulder, which is here said to be composed of two bones, both covered in and hidden by numerous overlying muscles. The upper bone, or shoulder-blade, has the usual flattened and long, triangular shape, and is strengthened by a ridge or crest dividing it longitudinally into two somewhat unequal portions. The shoulder-blade, or *scapula*, rests on the ribs, the short side, or base of the triangle, being placed just below the withers, and its point directed downward and forward, nearly on a level with the top of the breast-bone. The shoulder-

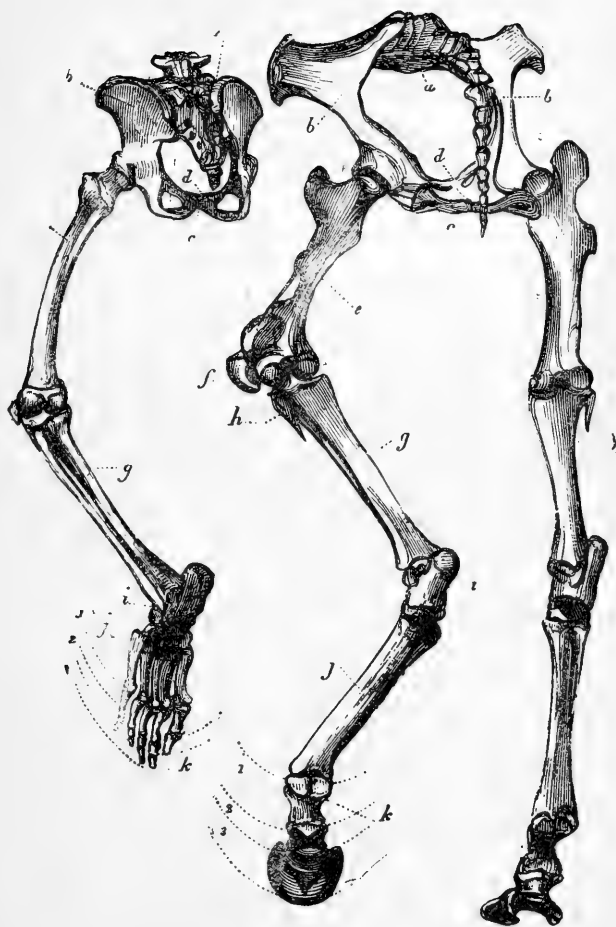


PLATE II.—Legs of Man and Hind-Legs of the Horse Compared.

blade has no osseous connection or articulation with the body of the horse, but is united to it solely by muscles, which will be spoken of more in detail when we come to the shoulder. The clavicles, or collar-bones, so well known in man and a few quadrupeds, do not exist in the horse. The lower bone of the shoulder, as it is commonly called, corresponds to the *humerus*, or upper bone of the human arm. It is a short, thick, and somewhat twisted bone, articulating by a rounded head with the *glenoid*, or cup-shaped cavity at the point of the shoulder-blade. Its lower extremity, which is directed backward, terminates in two condyles, receiving between them the head of the principal upper bone of the leg. This portion of the fore-leg, commonly called the arm (*fore-arm*, human), is composed of two bones, a long one in front, termed the *radius*, which extends to the knee, and a short one behind, called the *ulna*. The latter bone has a long projection above and behind the upper joint, and forms the point of the elbow, to which some powerful muscles are attached for extending the arm. It rapidly diminishes in size toward its lower extremity, and terminates in a point before it reaches the knee. In old horses these two bones of the arm become firmly united into one.

The knee is a complicated joint uniting the arm to the shank or leg, and is composed of six small bones interposed between the upper and lower portions of the fore-leg. We shall have occasion to describe the structure of this important joint at greater length on a subsequent page. Below the knee are the metacarpal bones, or those of the leg. They are three in number—the cannon and two splint bones behind. They represent the bones of the human hand—those between the wrists and the fingers. The remaining bones of the fore-legs are the upper and lower pasterns, and the coffin-bone, surrounded by the hoof, or nail,

together forming a single stout finger—the only one developed.

In the hind-legs, we find a very similar arrangement of the bones. We have already spoken of the pelvic arch, made up of the several bones of the haunch. At a point on the outer surface of the pelvis, and at the junction of the three component bones on each side, a deep, cup-shaped cavity, called the *acetabulum*, is formed to receive the round head of the true thigh-bone, or *femur* (Pl. II, *e*). Great strain is thrown on this joint; it is therefore well protected by the bony cup, or *acetabulum*, to whose center the head of the *femur* is further secured by an exceedingly strong ligament. The *femur*, or true thigh-bone, is so much concealed by the large muscles of the hind-quarters that its true relations, or even its existence, may not be recognized in the living horse. This circumstance has led to the confusion of names into which horsemen have fallen when speaking of the different parts of the hind-leg.

The lower extremity of the *femur* is united to the bones of the true leg (*tibia*) by the “stifle-joint,” which also includes the *patella*, or knee-cap (Pl. II, *f*), this joint corresponding to the knee in human anatomy. The bones of the leg (“thigh” of horsemen) are the *tibia* and *fibula* (Pl. II, *g*, *h*), articulating below with the numerous small bones of the ankle. The “hock” (Pl. II, *i*) is formed by a number of small bones, one of them having an elongated, lever-like form, with its free extremity directed upward. This is the *os calcis*, or bone of the heel. Into this bone the tendons of several powerful muscles are inserted, and a great deal of the springing power of the horse, as well as in other jumping animals, is due to the position and action of this part of the hinder limb.

The remaining bones of the hind-leg agree generally with those of the corresponding portions of the anterior (fore) limb.

IV. Bones of the Head and Neck.—PLATE III;
FIGS. 1 AND 2.

The bones of the head may be divided into two groups, those of the cranium and of the face. The cranial bones include all those which cover or inclose the brain. They are for the most part arranged in pairs, one on each side of the mesial line of the skull, but may conveniently be spoken of as single bones.

The *frontal*, or bone of the forehead (*a*), forms the broad, flat surface between the eyes, and extends with a narrowing outline toward the top of the head. The *frontal* occupies the widest part of the head. Considerable difference in the width of this bone may be noticed in various horses; and it will generally be found that the broad and ample forehead is a mark of high breeding and superior intelligence in the animal, as is often sufficiently indicated by the expression of the face. The *parietal* (*b*) extends backward from the frontal to the poll. It has a ridge or crest of great strength and hardness along the upper surface, from which the bone slopes down like a roof on each side, covering the brain, which it is mainly concerned in protecting.

Immediately behind the *parietal*, and covering the entire back of the head, is the *occipital* (*c*), a bone whose position exposes it to greater strain than any of the other component parts of the skull are liable to. The *occipital* has to support the whole weight of the head, which is articulated by two rounded protuberances, or *condyles*, at the base of this bone to the *atlas*, or first vertebra of the neck. On the outer sides of the *occipital*, and beyond the *condyles*, are two styliform processes or pointed projections for the attachment of some of the muscles of the neck which assist in supporting the head.

The *temporal* bone (*d*) unites above with the *parietal*, and behind with the *occipital*. It contains the internal parts

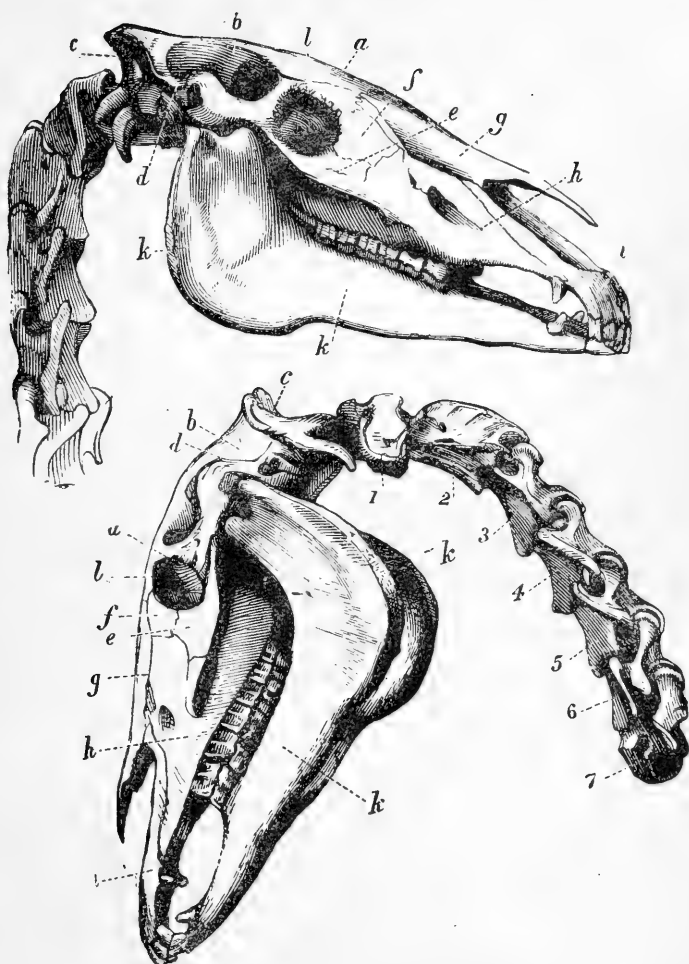


PLATE III.—Bones of the Head and Neck.

a, Frontal; *b*, Parietal; *c*, Occipital; *d*, Temporal; *e*, Malar; *f*, Lacrimal; *g*, Nasal; *h*, Superior maxillary; *i*, Pre-maxillary; *k*, Inferior maxillaries, or lower jaw; *l*, Orbit. Cervical vertebræ—1, Atlas; 2, Dentata; 3, Third; 4, Fourth; 5, Fifth; 6, Sixth; 7, Seventh.

of the ear, and has a depression or hollow beneath for the articulation of the lower jaw. Anteriorly, this bone joins the extremity of the *frontal*, and continuing forward unites with the *malar*, or cheek-bone (*e*), making up the *zygomatic arch*, and forming the greatest part of the orbit, which is completed by the *lachrymal* (*f*), a small facial bone at the inner corner of the eye. Immediately before the frontal is the *nasal* bone (*g*), one of the principal bones of the face, and covering the delicate membrane of the nose. The *superior maxillary* (*h*) is a large bone occupying the side of the face. It carries all the molar teeth, or grinders, and the tusk of the upper jaw. The nippers, or incisor teeth, are inserted in the *pre-maxillary* (*i*), which, uniting with the two bones last mentioned, completes the framework of the nose. The lower jaw consists of two bones only, the *inferior maxillaries* (*k*). These are rounded at the hinder extremity of the jaw, and terminate in two processes directed upward.

The terminal projection, or *condyloid process*, articulates with the *temporal* bone at the base of the *zygomatic arch*, and forms the hinge on which the whole lower jaw moves. The second process, termed the *coronoid*, passes under the arch, and receives the lower end of the large *temporal* muscle which arises from the parietal bone, and is principally concerned in moving the jaw in the act of mastication. There are also two small bones in the lower part of the cranium, under the *parietal*—the *sphenoid* and *ethmoid*; they serve to connect the principal bones of the skull, but as they are not visible externally, they do not need description for artistic purposes. The bones of the neck, as we have already mentioned, are seven in number. The *atlas*, which articulates with the skull, is a ring-shaped bone with broad lateral projections, but without any other prominent characteristics. It has great freedom of motion on the

second bone, or *dentata*, and, on the peculiar articulation of these two vertebræ, the power of turning the head mainly depends. The remaining five bones of the neck closely resemble one another; they have various small processes for the insertion of muscles and ligaments, and their form will be sufficiently understood by an examination of Plate III.

V. Muscles of the Head and Neck.—PLATE IV;
FIGS. 1 AND 2

The muscles of the head are not very numerous, and those requiring the most attention will be found in the immediate neighborhood of the mouth and nostrils.

The largest superficial muscle is the *masseter* (Pl. IV; Figs. 1, 2, *a*). This forms the cheek of the horse, and extends along a ridge by the side of the head, below the eye, to the rounded posterior angle of the lower jaw, which has a roughened surface for its more secure attachment. Its action is to close the mouth. The *temporal* muscle (*b*) also assists in this office. It arises from the medial ridge of the parietal bone, clothing its roof-like walls, and is inserted within the zygomatic arch to the coronoid process of the lower jaw-bone. The dimpling which may be observed during mastication above the eye of the horse is produced by the action of this muscle in alternately raising and depressing the under jaw. The *orbicularis* (*c*) is a circular muscle surrounding the eye and closing the eyelids. Above the eye, and directed inward and upward, is a small *levator* muscle (*d*), which passes over the *orbicularis* and raises the upper eyelid.

The muscles of the ear are not very conspicuous. Three of them may be shortly noticed. The first, proceeding from the base of the ear, extends a short distance forward and turns it in that direction; the second, behind the ear, directs inward and backward; and the third descends as a



PLATE IV.—Muscles of the Head and Neck.

HEAD.—*a*, Masseter; *b*, Temporalis; *c*, Orbicularis; *d*, Levator; *e*, Orbicularis oris; *f*, Dilator naris lateralis; *g*, Zygomaticus; *h*, Nasalis labii subperi-oris; *i*, Depressor labii inferioris.

NECK.—*j*, Complexus major; *k*, Splenius; *l*, Levator anguli scapulæ; *m*, Hyoideus; *n*, Sterno-maxillaris; *o*, Levator humeri, or deltoideus.

narrow strip at the back of the cheek to incline the ear outward.

The frontal and nasal bones have no prominently perceptible muscular covering, the difference in the shape of these parts in various horses being entirely due to the variation in the relative size and proportion of the particular bones.

Of the muscles of the lips and nose, the *orbicularis* (*e*) is one of the most special importance. It entirely surrounds the mouth, and by its action the lips are pushed out or closed. This muscle is brought into play whenever the lips are required to seize or hold anything between them. The *dilator naris lateralis* (*f*) is a pyramidal muscle covering the whole exterior of the nostril, and having its origin close to the anterior point of the masseter. It is the great *side* dilator of the nostril, and also raises the upper lip. The *zygomaticus* (*g*) draws back the corner of the mouth, whence it may be traced upward, outside the masseter, to its origin on the zygomatic arch. The *buccinator*, a muscle on the inside of the mouth and cheek, and consequently scarcely visible externally, has the same office as the preceding.

The *nasalis labii superioris* (*h*) extends from a depression in front of the eye toward the angle of the mouth, a short distance above which it divides into two parts, the side dilator of the nostril (*f*) passing between them. One of these portions is continued straight to the corner of the mouth, which it raises; the other part expands under the side dilator, and assists it in the office of dilating the nostril. It also helps to lift the upper lip.

The under lip is drawn back by the *depressor labii inferioris* (*i*), a narrow muscle which is inserted into the lip below the angle of the mouth, and passing along the side of the jaw, disappears under the masseter.

Independently of the muscles for supporting the head and neck, there is a very beautiful and simple arrangement by which those parts are kept in an easy and natural position when the horse is at rest. This consists of a very strong and elastic ligament called the *ligamentum nuchæ*. It takes its origin from the back of the occipital bone, to which it is attached immediately below the crest. At first it is in the form of a stout, round cord. It passes over the *atlas*, or first joint of the neck, to allow full freedom of motion to the head, and is strongly adherent to the *dentata*, on which the principal strain from the weight of the head is thrown; it then proceeds backward to its termination on the elevated spinous processes of the first dorsal vertebræ. The withers, as these elevated parts are called, have thus an important office—that of supporting the weight of the entire head and neck when in their ordinary position. But provision must also be made for lowering and raising the head, and for these purposes there are special muscles. The first to be noticed is the *complexus major* (Fig. 1, *j*). It arises from the transverse processes of the four or five first dorsal vertebræ, and also from the five lower bones of the neck; the fibres from these two points uniting to form one large muscle, which, diminishing in size in direction of the head, terminates in a tendon inserted into the occipital bone. This muscle makes up the principal portion of the lower part of the neck. Immediately above this is the *splenius* (*k*), specially employed in raising the head. It arises from the entire length of the *ligamentum nuchæ*, and is directly inserted into all the bones of the neck, except the first, with which, however, and the temporal bone of the head, it has a separate and less distinct connection. To the form and development of the splenius, the beauty of the neck of the horse is mainly due. It is here the greatest thickness is found; and from being

sometimes overloaded with cellular substance or fat, an appearance of clumsiness may be produced. The thick crest and massive neck of the entire horse are, to a large extent, due to the abundant development of this muscle; and the student or breeder will do well to acquire a thorough knowledge of its form, which in every condition and breed of the horse so largely contributes to give a character to the neck.

Behind the splenius, and extending along the superior margin of the neck, is the *levator anguli scapulæ* (*l*). It is inserted into the back of the head, and attached to the first four bones of the neck, as well as to the great ligament; then descends to the shoulder, where it is not visible externally. It has a reciprocal action on the neck and shoulder, according to whichever is the fixed point at the time.

Of the muscles in front of the neck, is the *hyoideus* (Plate IV, Fig. 2, *m*). Its upper extremity is always conspicuous immediately below the head at its junction with the neck. It is attached to the hyoid-bone of the tongue, which it retracts and descends along the front of the neck to the shoulder, but is covered in the greatest part of its length by other muscles, and is only visible for a short distance below the head. Outside this muscle, and partly covering it, is the *sterno-maxillaris* (Plate IV, *n*), the principal depressor of the head. It arises from the upper end of the sternum, or point of the breast, covers the lower front of the neck, then proceeding upward by the side of the *hyoideus*, is inserted by a flat tendon into the posterior angle of the lower jaw. It is not a very large muscle, for when those supporting the head and neck are relaxed, but little force is required to pull the head down.

Beyond the *sterno-maxillaris*, and extending from the back of the head and upper part of the neck along the

front of the shoulder to the top of the fore-leg, is the *levator humeri*, or *deltoïdes* (Plate IV, o), a long and very important muscle, having, in fact, a double function to perform. When the head is kept up by its proper muscles, it becomes a fixed point, from which the *levator humeri* is enabled to raise the shoulder. This is probably its principal office. Its action, however, can also be reversed, and with the shoulder for a fixed point, the head can be depressed, a small slip of the muscle being carried forward to the point of the sternum to pull the head in that direction.

It must be remembered that, with very few exceptions, the muscles are all arranged in pairs—sometimes, though rarely, in contact—and thus in speaking of them in the singular number, unless otherwise stated, we are referring to their positions and functions on each side of the animal.

VI. Bones and Muscles of the Shoulder.—The shoulder-blade, or *scapula* (Plate I, 9), consists of a single bone, and connects the fore-leg with the trunk, corresponding in its relation to that of the haunch-bone to the hind-leg. There is, however, this important difference between them: the haunch-bones are anchylosed or united to the *sacral* portion of the backbone, in order to provide a firm point from which those powerful levers, the hind-legs, can act; the shoulder, on the contrary, has to receive a violent shock from the weight of all the front part of the animal suddenly falling on the fore-legs. The shoulder has, therefore, only a muscular attachment to the trunk; and by this arrangement no jar is received by the spine, and any injury to the important viscera of the chest is rendered unlikely.

The shoulder-blade is of a long, triangular form, with its apex directed downward, nearly on a level with the point of the breast, and its somewhat rounded base resting on the ribs immediately below the withers. It is divided

externally into two portions by a ridge or crest running nearly the length of the blade, and a little on one side of its *medial* line. This ridge of bones gives additional firmness to the shoulder-blade, and affords a surface for the attachment of some very important muscles. At the lower extremity of the shoulder-blade is a cup-shaped hollow, called the *glenoid cavity*, with which the rounded head of the bone (*humerus*) of the shoulder articulates. Above this joint, on the anterior edge of the *scapula*, is the *acromion* process, to which, in man and some few quadrupeds, the clavicle, or collar-bone, is united. This bone, however, is not found in the horse, nor in other animals which have but little power of lateral motion in the front limbs.

Following the custom of horsemen, and adopting their nomenclature for the bones of the horse, we treat of the "lower bone of the shoulder," the *humerus* (Plate I), in every respect corresponding with that part of the human arm which extends from the shoulder to the elbow, but which, in the horse, is so hidden by the muscles as not to be externally visible as a distinct bone of the front limb. The lower bone of the shoulder is short and strong; it articulates by a rounded head with the glenoid cavity of the *scapula*, and has considerable freedom of motion. Its direction is backward, and at almost a right-angle with the shoulder-blade. It has several large protuberances at the upper end of the bone, and to which are attached the principal muscles for moving it. The lower extremity terminates in two *condyles*, or heads, between which the superior end of the arm-bone is received.

VII. Muscles of the Shoulder and Back.—

PLATES V AND VI.

Of the muscles of the shoulder, we may first notice the *trapezius* (Plates V, VI). It rises from the ligament of



PLATE V.—Muscles of the Shoulder and Back.

x, Trapezius; *a*, Pectoralis minor; *b*, Antea spinatus; *c*, Postea spinatus; *d*, Teres minor; *e*, Anconæus longus; *f*, Anconæus externus; *g*, Serratus major; *, Lattissimus dorsi; *p m*, Pectoralis major. See also Plate VI.

the neck and the principal bones of the withers, and terminates in a pointed shape on a prominent part of the ridge of the shoulder-blade. Its office is to raise and support the shoulder, assisting the *serratus major* (Plate V, *g*), a very important muscle, but hardly visible externally, as it is principally situated between the shoulder-blade and the ribs of the horse, forming the main connection between them.

The *antea spinatus* (Plates V, VI, *b*), taking its name from its situation, occupies the outer surface of the scapula, on the front side of the spine or ridge of that bone. It proceeds to the lower bone of the shoulder, and, dividing into two parts, is inserted into the two prominences in front of it, extending the bone forward. The *postea spinatus* (Plates V, VI, *c*) is situated on the other side of the spine of the shoulder-blade, and is inserted into the upper and outer head of the bone, drawing it outward and raising it. Behind the *postea spinatus* is a small muscle called the *teres minor* (Plates V, VI, *d*), or little pectoral; it draws the shoulder forward toward the breast. The *pectoralis major* (Plate VI, *p, m*) is conspicuous inside the arm at its junction with the body. It is an important muscle, and pulls the whole fore-leg inward, keeping it on a line with the body and insuring an even and regular action of the limb. On the outside of the shoulder, and readily seen in the living horse when in motion, are two muscles, which, arising from the lower bone of the shoulder, are inserted into the point of the elbow. They are called the *anconæus longus* (Plates V, VI, *e*) and the *anconæus externus* (Plates V, VI, *f*). Their office is to straighten and extend the arm—in other words, to bring the front limb into a perpendicular position, and as nearly as possible in a line with the *humerus*, or, as we have called it, the “lower bone of the shoulder.” The muscles which bend the arm up-

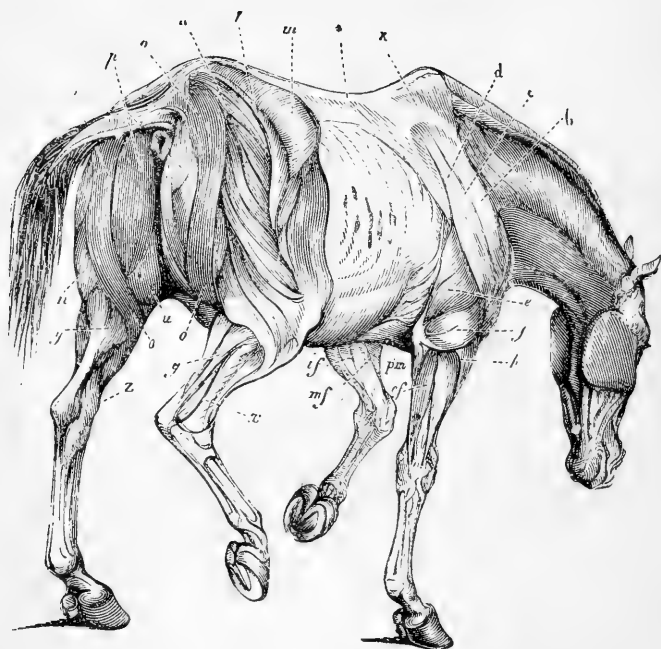


PLATE VI.—Muscles of the Shoulder and Back.

ward are not visible externally, but are almost entirely covered by those of the shoulder.

The muscles of the back do not require any lengthened notice. The *lattissimus dorsi* (Plates V, VI) is the most important; it covers the whole back, extending from the shoulder to the haunch, and is strongly attached to the processes of the vertebræ and the ribs. This muscle is the principal one employed in raising the fore or hind quarters in the act of rearing or kicking. That part of it which comes nearest to the surface is generally covered by an ordinary saddle, but no portion of this muscle is at any time very distinctly visible.

VIII. Bones and Muscles of the Front Limbs.—

PLATE VII; FIG. I; BONES.

The upper portion of the fore-leg, or, as it is commonly called in the horse, the arm (*fore-arm*, human), extending from the elbow to the knee (*carpus*), consists of two bones, the *radius* and the *ulna*. The *radius* is the more important of the two, and in the young horse is the great support of the leg. It is the long front-bone, is nearly straight, and receives into depressions on its upper end the two heads of the inferior extremity of the lower bone of the shoulder. The other end of the *radius* fits onto the upper layer of the bones of the knee (*carpus*). The *ulna* is situated behind, and to some extent above the *radius*, there being a considerable projection of the former received between the heads of the lower bone of the shoulder, and called the elbow. This forms a powerful lever, into which are inserted the muscles for extending the arm, as already noticed in our account of the muscles of the shoulder. The *ulna* is continued downward, gradually diminishes in size, and terminates in a point behind the middle of the *radius*. These two bones of the arm are at first distinct and separate, but

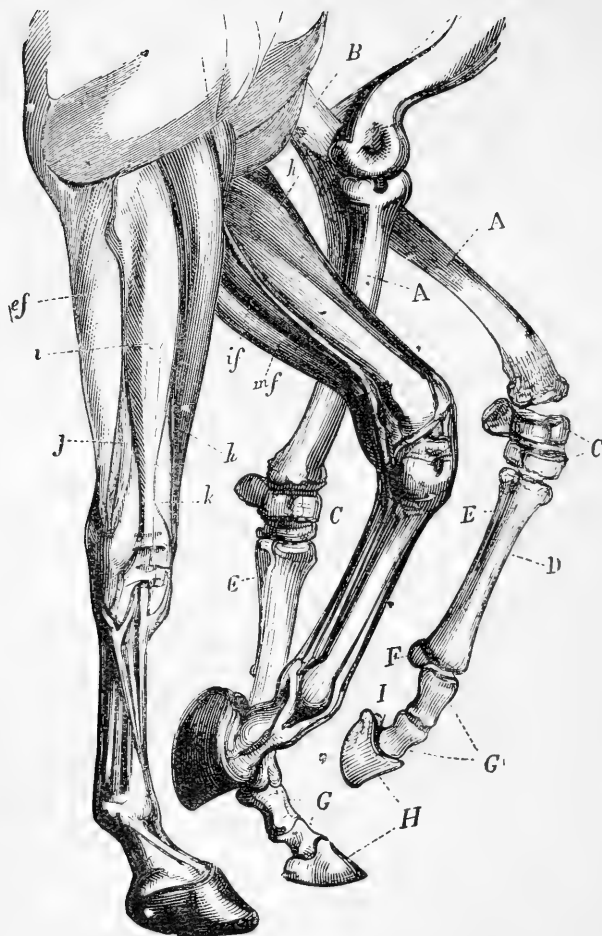


Fig. 2.

Fig. 1.

PLATE VII.—Bones and Muscles of the Front Limbs.

A, Radius; B, Ulna, point of; C, Knee (*carpus*); D, Cannon, or Shank; E, Splints; F, Sesamoids (behind Fetlock); G, Upper and Lower Pasterns; H, Coffin-Bone; I, Navicular.

FIG. 2.—Muscles. *h*, Extensor carpi radialis; *i*, Extensor digitorum longior; *j*, Extensor digitorum brevior; *k*, Abductor pollicis longus; *ef*, External flexor; *mf*, Middle flexor; *if*, Internal flexor.

before many years have passed the cartilaginous and ligamentous connection between them becomes ossified, and the two bones are firmly united into one.

The knee (Fig. 1, *c*), corresponding to the human wrist (*carpus*), is a part of the fore-leg to which the attention of the artist should be particularly directed, as its form is always a characteristic and prominent feature in the outline of the horse, and one to which, like the hand in the drawing of the human figure, severe scrutiny is likely to be applied. The knee is a complicated joint, that is, it is composed of numerous small bones interposed between the lower end of the radius and the upper extremity of the shank, or cannon-bone. A weak-kneed horse, therefore, is always a dangerous one to the rider or driver. Hence a weak-kneed stallion should never be used to cover, and a weak-kneed mare should never be used as a breeder.

The position and action of this joint render it peculiarly liable to external injury and violent jars or strains; it is therefore so made up that any shock it may receive will be distributed over a number of distinct bones, each protected by a covering of cartilage, and resting on a kind of semi-fluid cushion, the whole being strongly united together by ligaments.

IX. Bones of the Hind Limb.—It will be unnecessary to give any detailed account of the bones of the haunch, as they have been sufficiently described in the general sketch of the skeleton. It will, therefore, only be necessary to point out the characters of the bones of which the hind-leg is composed.

Beginning at the upper extremity of the limb, the first bone to be noticed is the *femur*, or true thigh (Pl. II, *c*); and here we must direct the reader's attention to the list

of the names applied to corresponding bones in the skeletons of man and horse (see page 64), that he may become familiar with the true relation of the several parts of the hind-leg, so commonly misnamed when speaking of the horse. We shall, as before, use the forms most familiar to the horseman, explaining them as may appear desirable for the due comprehension of the subject. This bone (*femur*) is so entirely hidden by various muscles of the haunch as to be unrecognized and unnamed by those persons who are not acquainted with anatomy. We shall speak of it as the "upper bone of the thigh," a term that may be easily remembered by those who apply the name of "thigh" to the next lower bone of the series.

The "upper bone of the thigh" (*femur*) is exceedingly strong and stout. It is short for its bulk, which is further augmented by several large projections, or *trochanters*, placed longitudinally for the attachment of some important muscles. The upper extremity of the *femur* has a distinct, rounded head on the inner side, fitting into and articulating with the *acetabulum*, or bony cup formed at the junction of the three *pelvic* bones. The lower end of the bone bears two prominences, which fit into corresponding depressions in the next bone, and in front of which is placed the *patella*, or knee-cap (Pl. II, *f*), together making up the "stifle-joint" of horsemen, or, more strictly speaking, the actual "knee" of anatomists. The "thigh" (*leg*, human) consists of two bones, the *tibia* (Pl. II, *g*) and the *fibula* (Pl. II, *h*). The *tibia* extends from the stifle-joint, which it helps to form, to the "hock" (*ankle*, human). The *fibula* is placed behind on the outer side of it, extending from its upper extremity to about one-third of its length. It is attached to the larger bone by cartilage, and agrees in general character with the small bone, or *ulna*, in the fore-leg.

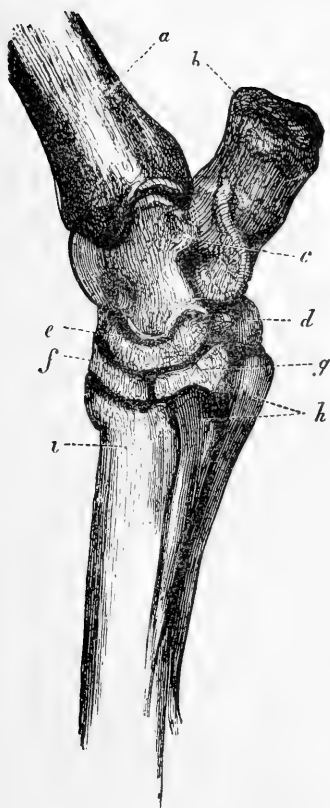


Fig. 1.

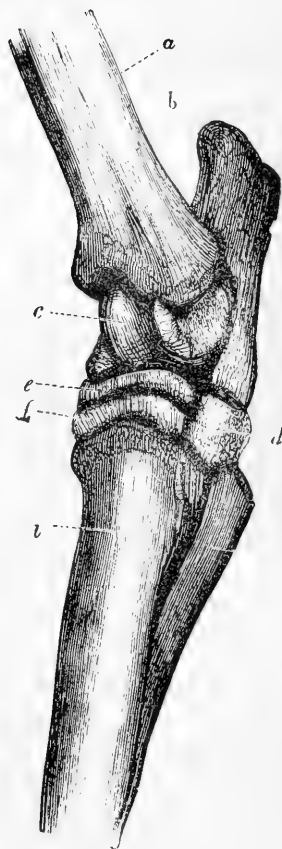


Fig. 2.

PLATE VIII.—Bones of the Hock.

a, Tibia; *b*, Os calcis; *c*, Astragalus; *d*, Cuboides; *e*, Naviculare; *f* Outer cuneiform; *g*, Middle cuneiform; *h*, Splint; *i*, Cannon, or shank.

X. Bones of the Hock (*tarsus*).—PLATE VIII. FIG. 1, BACK VIEW, INNER SIDE. FIG. 2, FRONT VIEW, OUTER SIDE.

The *hock* (Plate VIII) is an important and somewhat complicated joint. It corresponds to the ankle and heel in man, although in the horse it is at some distance from the ground. Like the knee of the horse (*carpus*), the hock (*tarsus*) consists of several small bones interposed between the long ones of the lower part of the limb. They are six in number, and of various shapes (for a knowledge of which we must refer the reader to Plate VIII, which gives a front and inner side view of the joint with the several bones in their natural positions). We may, however, direct attention to the projecting bone at the back of the joint. This bone, the *os calcis*, or heel-bone, forms what is called the "point of the hock." It acts as a lever to straighten the leg, and is moved by the *tendo Achillis*, and other tendons arising from the muscles which spring from the upper part of the limb. It is considerably developed in all fast-moving animals, an increase in the length of the lever adding considerably to the force of the spring.

XI. Comparative View of the Bones of the Pelvis and Limbs of Man and the Horse.—SEE PLATE II.

Pelvis—*a*, Sacrum; *b*, Ilium; *c*, Ischium; *d*, Pubis. *e*, Femur; *f*, Patella; *g*, Tibia; *h*, Fibula; *i*, Tarsus; *j*, Metatarsus; *k*, Digit. 1, 2, 3, Phalanx.

The remaining bones of the hind-leg do not require any lengthened description, as they agree generally with those in the lower part of the fore-leg. The "leg" (*metatarsus*, Plate II, *j*) is composed of the shank and two splint-bones, the former uniting at the fetlock-joint with the upper pastern, which is followed by the other bones of the toe, as in the front limb.

In Plate II is a comparative view of the limbs of man and the horse, by which the true nature and rela-

tions of the several bones may be readily understood, and to which our observations on a similar comparison of the front limbs are generally applicable.

To elucidate the structure of the limbs more fully, we introduce three plainly figured engravings. It will only be necessary here to show the limbs below the hock and knee, including the hoof, to give an idea of the importance of the limbs. Fig. 1

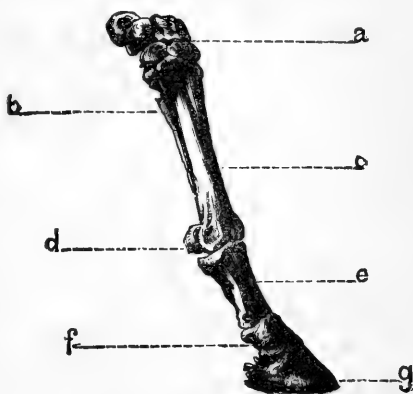


Fig. 1.

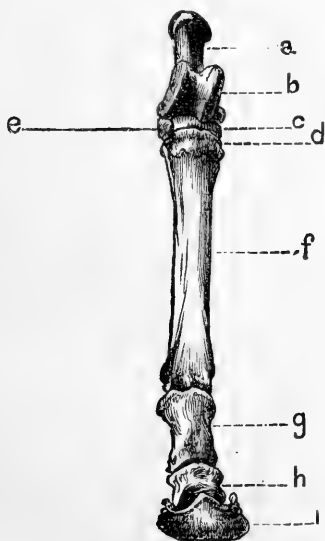


Fig. 2.

shows the bones of the fore-leg, side view; (*a*), bones of carpus; (*b*), splint or splint bone; (*c*), cannon-bone; (*d*), sesamoid-bone; (*e*), pastern-bone; (*f*), coronet-bone; (*g*), coffin-bone. At Fig. 2 is shown bones of hind-leg, front view; (*a*, *b*, *c*, *d*, *e*), bones of the tarsus; (*f*), cannon-bone; (*g*), pastern-bone; (*h*), coronet-bone; (*i*), coffin-bone. Fig. 3 shows a side view of hind-leg; (*a*), bones of the tarsus; (*b*), splint-bone; (*c*), cannon-bone; (*d*), sesamoid-bone; (*e*), pastern-bone; (*f*), coronet-bone; (*g*), coffin-bone. It will be

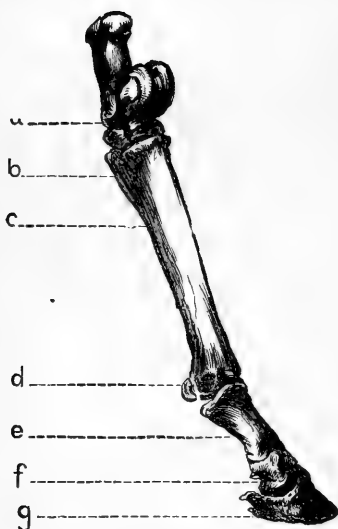


Fig. 3.

seen that below the knee and hock the names of the bones are similar. Thus, with the cut of skeleton previously given, the reader will not only get a perfect idea of the proper location of the bones, but their correct names.

This matter of a correct study of principal bones and muscles is more important than may seem at a first glance; for with a knowledge of the scientific names and location, it assists greatly the comprehension of the breeder.

XII. Muscles of the Hind-Quarters.—PLATES VI AND IX.

Under this heading are included all muscles which are concerned in and connected with the motion of the hind-limbs.

The muscles of the hind-quarters are for the most part strongly marked, and the situation of the principal ones easily recognized.

Prominent on the front and outer part of the haunch is the *glutæus medius* (VI and IX, *m*). It arises from the processes of several of the vertebræ of the loins, and from the prominent parts of the *ilium*, terminating at its intersection in the great *trochanter*, or projection on the upper bone of the thigh (*femur*). It is a very important muscle, and acts with considerable power in raising and bringing forward the femur. It has been called the "kicking muscle."



PLATE IX.—Muscles of the Hind-Quarters.

l, Glutæus externus; *m*, Glutæus medius; *n*, Triceps femoris; *o*, Biceps; *p*, Semi-membranosus, Plate IX; *q*, Musculus faciae latæ; *r*, Rectus; *s*, Vastus externus; *u*, Gracilis; *v*, Extensor pedis; *w*, Perinæus; *x*, Flexor pedis; *y*, Gastrocnemi; *z*, Flexor metatarsi.

The *glutæus externus* (VI and IX, *l*) is a slender muscle attached to the *glutæus medius*, having a generally similar origin and function.

Among the most conspicuous muscles of the hind-quarter, especially when the horse is in motion, is the *triceps femoris* (Pls. I, VI, IX, *n*), or three-headed muscle of the thigh (*femur*). Strictly speaking, it is made up of three muscles, but as they are united and have a common action, it will be convenient to speak of them as one. It takes its origin from several of the bones of the spine, including some at the root of the tail, and from various parts of the haunch-bones; it then curves downward and forward, dividing into three heads, which are inserted broadly into the upper part of the lower bone of the thigh, behind the "stifle-joint," or true knee. Its action is evidently to draw back the stifle-joint; in other words, to straighten the leg. It has, therefore, enormous power in impelling the animal forward. The *glutæi* muscles bend the leg preparatory to taking the spring, and the *triceps* acts in opposition, forcing the leg straight, and consequently lifting the body forward. The posterior margin of this muscle may be more or less distinctly observed, parallel to the outline of the buttock, in all kinds of horses, but is particularly evident in hunters and racers, where high condition has resulted from the proper exercise of these powerful springs of motion. Parallel with, and immediately behind the *triceps*, is the *biceps* (VI, IX, *o*). It springs from the *sacrum* and the first bones of the tail, and descending to the inner side of the lower bone of the thigh (*tibia*), forms the outer posterior border of the haunch, and assists in straightening the leg. The *semi-membranosus* (IX, *p*) is also one of the flexors of the leg; it forms the inner posterior border of the haunch, and unites on the *mesial* line, under the tail, with its fellow-muscle of the other quarter.

On the outer front part of the haunch is the *musculus fasciæ latæ* (Pls. I, VI, *q*). It arises from the anterior portion of the crest of the *ilium*, and is inclosed between two layers of tendinous substance, which disappears below the stifle. This peculiar muscle binds down and secures the other muscles in front of the haunch. The *rectus* (Pl. VI, *r*) proceeds from the *ilium* in front of the hip-joint, and is inserted into the *patella*, or knee-cap. It forms the front edge of the thigh. Behind the *rectus*, and also inserted in the *patella*, is a large muscle called the *vastus externus* (Pl. VI, *s*), of which a part only can be seen externally. These muscles are powerful extensors of the thigh.

Descending inside the thigh is a narrow strip of muscle, terminating just below the stifle-joint. This is the *sartorius*, or "tailor's muscle;" it bends the leg (*tibia*) and turns it inward. It can hardly be seen. By the side of this muscle, and to the rear of it, occupying the principal surface of the inside of the thigh (*femur*), we find the *gracilis* (Pls. I, IX, *u*) inserted, like the *sartorius*, into the upper part of the lower bone of the thigh (*tibia*). Of the muscles which move the lower portion of the leg and the foot, the *extensor pedis* (Pls. I, IX, *v*) is the most important. It arises behind the stifle, from the extremities of the two bones of the thigh (*femur* and *tibia*), and descending to the hock, where its tendon passes under a sheath, confining it to its place in front of that joint, continues its course to the foot, and is inserted by a wide expansion into the front of the coffin-bone. The *perinæus* (Pl. IX, *w*) follows much the same course as the last muscle, but takes a more lateral direction. It arises from the *fibula*, and the tendon passes on the outside of the hock, after which it descends to the foot with the tendon of the *extensor pedis*. These muscles lift the foot forward. Between these muscles there

is a small, narrow one, having the same function as the others, and whose tendon is visible just above the hock. The *flexor pedis* (Pls. VI, IX, *x*) is one of the principal muscles for bending the foot. It arises from the upper part of the tibia, and becoming tendinous before it reaches the hock, passes as a large, round cord through a groove at the back of that joint; it then descends behind the shank-bone to be inserted into the two pasterns. At the back of the "thigh" (*tibia*) the extremities of the *gastrocnemii* may be seen (Pls. VI, IX, *y*), with united tendons (*tendo Achillis*), passing to the "point of the hock" (*os calcis*), where they are strongly inserted. There is some little difference between the development of the muscles whose tendons lead to the heel in man and the horse. In man, the artist will remember the *soleus* as forming the principal element in the great tendon of the heel. The *gastrocnemii* also contribute toward it. In the horse, however, these latter muscles take a more important share, and are aided by the *plantaris*, which, in man, is extremely small. The *soleus*, on the other hand, is as little developed in the horse.

We may notice one muscle on the inside of the "thigh" (*tibia*). In Pls. VI, IX, *z*, is the *flexor metatarsi*, or bender of the "leg." It originates above the "stifle," on the upper bone of the thigh (*femur*), and is inserted into the shank and inner splint-bone. It lies just within the anterior margin of this "thigh" (*tibia*), and acts with considerable power in bending the hock, thereby raising the metatarsal bones. The *metatarsus* (Pl. VII, *j*) is entirely without muscular covering, its shape being solely due to the form of its component bones, and the position of the tendons and ligaments which pass over it in their descent to the pastern and foot.

PART VII.

AGE INDICATED BY THE TEETH.

I. "Stonehenge," the late J. H. Walsh, F. R. C. S., gives a most careful study of the teeth of the horse as indicating age. In this connection, the editor would say, that the whole must be taken approximately. For instance, gritty pastures, or solid food, will wear the teeth fast; nevertheless, a careful study of what we give, including the illustrations, will enable the reader, with a little practice, to determine, with tolerable accuracy, up to the age of eight or nine years. After that age the determination is by no means accurate. However, by the wear of the teeth, the sunken eyes, the caving in of the temples, the sharpening of the under surface of the lower jaw, the age can be very nearly arrived at. Other indications of extreme age are in the prominence of the bones of the tail, and the increasing angularity of the bones of the body generally.

II. The Teeth.—The teeth are developed within their appropriate cavities, or sockets, which are found exactly corresponding with their number in the upper and lower jaws, being narrower in the lower than in the upper. Before birth they are nearly all in a state of incomplete growth, covered and concealed by the gums, but soon afterward they rise through it in pairs, the first set, or milk-teeth, being in course of time superseded by the permanent teeth, as in all the mammalia. The following is the formula of the complete dentition of the horse:

Incisors (nippers) $\frac{6}{16}$, canine (tushes) $\frac{3}{2}$, molars (grinders) $\frac{3}{4}$.

Each tooth is developed within its corresponding cavity in the jaw, and is made up of three distinct substances—cement, enamel, and dentine. The cement of the horse's tooth (sometimes called *crusta petrosa*) closely corresponds in texture with his bone, and, like it, is traversed by vascular canals. The enamel is the hardest constituent of the tooth, and consists of earthy matter arranged in the animal matrix, but contained in canals, so as to give the striated appearance which it presents on splitting it open. *Dentine* has an organized animal basis, presenting extremely minute tubes and cells, and containing earthy particles, which are partly blended with the animal matter in its interspaces, and partly contained in a granular state within its cells.

In the molar teeth, the arrangement of these three substances is the same, except that the cement and enamel dip down into two or more cavities instead of one, and are also reflected in a sinuous manner upon the sides. This inequality in the hardness of the component parts of these teeth causes them to wear away with different degrees of rapidity, and thus leaves a rough surface, which materially aids in grinding down the hard grain which forms a large portion of the animal's food. In the upper jaw, the table presented by each molar tooth is much larger than those of the corresponding lower teeth, and therefore it is easy to distinguish the one from the other.

The temporary or milk incisors differ in shape a good deal from the permanent set. The milk-teeth are altogether much smaller, but especially in the neck, which is constricted in them; whilst in the permanent set, which go on growing as they wear out, the diameter is nearly the same throughout. The former are also whiter in color, and with grooves or indentations on their outer surface running

toward the gum. Lastly, the mark on the table is much slighter than in the permanent teeth. The temporary molars are not distinguishable from the permanent teeth of that class except in size.

As a consequence of this arrangement of parts, the teeth, as they wear down, present a different appearance according to the extent to which their attrition has reached. On this fact is founded a means of arriving at a knowledge of the age of the horse after he has shed his milk-teeth, which, as a rule, he does in pairs at certain fixed periods. In order, therefore, to be able to estimate the age of the horse from his teeth, it is necessary to ascertain, as nearly as may be, the exact time at which he puts up each pair of his milk or sucking teeth, and afterward the periods at which they are replaced by the permanent teeth. Thus it has become the province of the veterinarian to lay down rules for ascertaining the age from the degree of attrition which the permanent teeth have undergone. For these several purposes, the horse's mouth must be studied from the earliest period of his life up to old age.

In horsemen's and breeders' terms, the incisors are nippers, the canine teeth tushes, and the molars grinders.

III. First Year.—By the end of the first year, the colt has cut his twelve nippers and sixteen grinders, which usually pierce the gums at the following months: Before birth, the eight anterior grinders have generally shown themselves, followed about a week after foaling by the two central nippers. At the end of the first month, another grinder makes its appearance all around, and in the middle of the second, the next nipper shows itself. By the end of the second month, the central nippers have attained their full size, and the second are about half-grown, requiring another month to overtake their fellows. Between the sixth

and ninth months, the corner nippers are cut, and toward the end of the first year reach their full size. This first set of nippers consists of teeth considerably smaller in size than the permanent teeth, and somewhat different in shape. They are more rounded in front and hollow toward the mouth, the outer edge being at first much higher than the inner. As they wear down, these two edges soon become level, but the corner nippers maintain this appearance for a long time. At six months, the central nippers are almost level, with the black "mark" in their middle wide and faint; and about the ninth month, the next nipper on each side above and below is also worn down almost to a level surface.

IV. Second Year.—During the second year, the following changes take place: In the first month, and sometimes toward the end of the first year, a fourth grinder is cut all around, which commences the set of permanent teeth, the first three molars only being shed. At a year and a half, the mark in the central nippers is much worn out, and has become very faint; the second is also worn flat, but it is not so faint; and the corner nippers are flat, but present the mark clearly enough. In colts which have been reared on grain and much hay, the wearing down proceeds more rapidly than in those fed upon grass alone. Gritty pastures also assist largely in the wear of the teeth.

V. Third Year.—The third year is occupied by the commencement of the second dentition, which is effected in the same order in which the milk-teeth made their appearance. Both sets are contained within the jaw at birth, the permanent teeth being small, and only partially developed, and lying deeper than the milk-teeth. As the mouth grows, it becomes too large for its first set of teeth, and the roots of these being pressed upon by the growth of the permanent set, their fangs are absorbed, and allow the

new teeth to show themselves, either in the places of the former, or by their sides, in which case they are known by the name of *wolf's-teeth*. This change proceeds in the same order as the cutting of the milk-teeth, commencing with the first grinder, which is shed and replaced by a permanent tooth early in the third year, a fifth grinder (permanent) making its appearance about the same time. Toward the end of this year, the sixth grinder shows itself, but grows very slowly, and the central nippers above and below fall out, and are replaced by permanent ones, which, as before remarked, are considerably larger in size and somewhat different in form.



FIG. I.—Three-Year-Old Mouth.

At three years, two central permanent teeth appear, the development varying a good deal in different individ-

uals. At three years and four or six months, the next nipper all around falls out, and is replaced by the permanent tooth. The corner nippers are much worn, and the mark in them is nearly obliterated. About this time, also, the second grinder is shed.

VI. Four Years Old.—At four years of age, the mouth should differ from that at three years old in the following particulars: The central nippers begin to lose

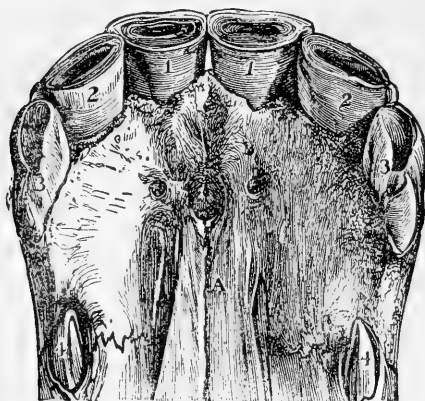


FIG. II.—At Four and a Half Years.

their sharp edges, and have grown considerably in substance. The next nipper all around has grown nearly to its full size, but not quite, and its edges are still sharp, with the mark deep and very plain. The corner milk-nippers still remain, unless they have been

knocked out for purposes of fraud, which is sometimes done to hasten the growth of the permanent teeth, and give the horse the appearance of being four or five months older than he is.

Between four and a half and five years, the corner nippers are shed, and the tush protrudes through the gum. These changes are shown at Fig. II.

VII. Five-Year-Old Teeth.—At five years, the mouth is complete in the number of its teeth; and from this date it becomes necessary to study their aspect in both jaws. Fig. III shows the upper teeth at this age. In the lower teeth, the edges of the central cavities are much worn, the central nipper having only a small, black speck in the middle of a smooth surface, while the next is much worn; and the corner teeth, though showing the mark very plainly, bear evidence of

having been used. The tush is much grown, with its outer surface regularly convex and its inner concave, the edges being sharp and well defined. The sixth molar is at its full growth, and the third is shed to make room for the permanent tooth in its place. These two last-named teeth should always be examined in cases where there is any doubt about the age. After five years, no further shedding occurs in any of the teeth.

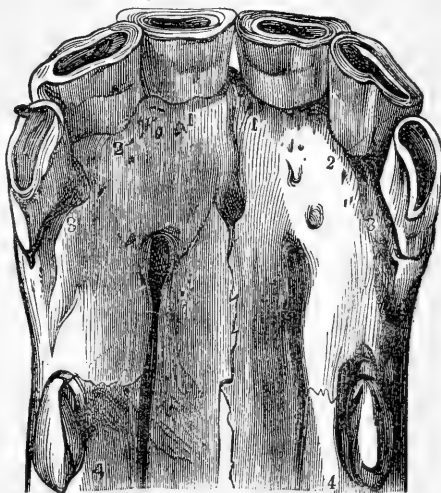


FIG. III.—Upper Nippers and Tushes at Five Years.

1. 1. Central nippers, with the mark still unobliterated.
2. 2. Next nippers, with the mark still plainer.
3. 3. Corner nippers, with the edges very slightly worn.
4. 4. Tushes, well developed, and still showing the groove on the outside plainly.

VIII. Six Years Old.—The six-year-old mouth is the last upon which any great reliance can be placed, if it is desired to ascertain the age of the horse to a nicety; but by attentively studying both jaws, a near approximation to the truth may be arrived at. It is ascertained that the nippers of the upper jaw take about two years longer to wear out than those of the lower; so that, until the horse is eight years old, his age may be ascertained by referring to them nearly as well as by the lower nippers at six. But, as different horses wear out their teeth with varying rapidity, it is found that this test can not be implicitly relied on; and in crib-biters or wind-suckers the upper teeth wear out

wonderfully soon. Fig. IV is taken from the lower jaw of a six-year-old horse, showing the marks of the central nippers almost obliterated, but presenting concentric circles of discolored, brown tartar in the middle; next to which is the cement, then the enamel and the dentine, with a thin layer of enamel outside. Up to this age, the

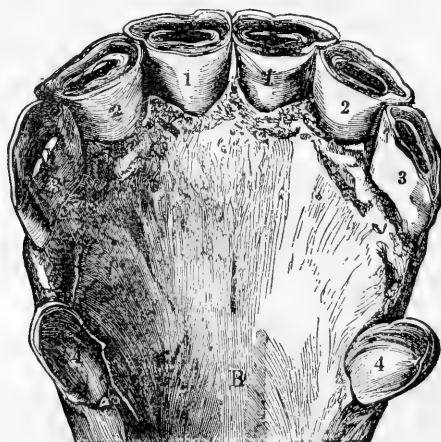


FIG. IV.—The Lower Nippers and Tushes of a Six-Year-Old Horse.

B. The lower jaw.

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|--|---|
| 1. 1. The central nippers, with the marks worn out. | with the edges of the cavity considerably worn. |
| 2. 2. The next nippers, with the marks disappearing. | 4. 4. The tushes, standing up three-quarters of an inch, with their points only slightly blunted. |
| 3. 3. The corner nippers, showing the mark plainly enough, but | |

nippers stand nearly perpendicular to each other, the two sets presenting a slight convexity when viewed together. Afterward, it will be seen, the nippers gradually extend themselves in a straight line from each jaw, and, in the very old horse, form an acute angle between them.

At about the eighth year, the upper nippers present the same appearance as already described in the lower nippers

at six years old. Both tushes are considerably worn away at their points, and the upper ones more so than the lower.

At nine years of age, the upper middle nippers are worn down completely. The next pair have a slight mark left, but their surfaces are quite level, and the corner nippers have only a black stain, without any central depression.

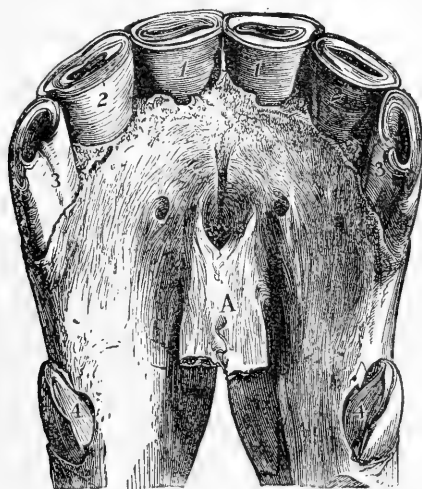


FIG. V.—Upper Nippers in the Eight-Year-Old Horse.

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|--|---|
| A. Anterior maxillary bone. | 3. 3. Corner nippers, showing the mark plainly enough. |
| 1. 1. Central nippers, worn to a plane surface. | 4. 4. Tushes, more worn down than in the lower jaw of the six-year-old mouth. |
| 2. 2. Next pair, still showing a slight remnant of the cavity. | |

IX. Aged Horses.—After nine years, the age of the horse can only be guessed at from his teeth, which gradually grow in length, and are more in a line with the jaw. The section of each nipper presented to the eye becomes more and more triangular instead of being oval, as seen in Fig. VI; but after about the twelfth year the triangular section disappears, and the tooth becomes nearly round. In accordance with the increase of length is the color of

the tooth altered, being of a dirty yellow in very old horses, with occasional streaks of brown and black. The tushes wear down to a very small size, and very often one or both drop out.

Allusion has already been made to the practice of removing the milk-nippers for the purpose of inducing a more rapid growth of the next set, which, however, is not materially affected by the operation; but dishonest dealers



FIG. VI.—Very old horse. Lower nippers and left tush. The right fallen out.

have recourse to another deception, called "bishoping," by which an aged horse may be passed off upon an inexperienced person for a six-year-old. The plan adopted is to cut off all the nippers with a saw to the proper length, and then with a cutting instrument the operator scoops out an oval cavity in the corner nippers, which is afterward burnt with a hot iron until it is quite black.

It is extremely easy to detect the imposition by carefully comparing the corner nippers with the next, when it will be seen that there is no gradation from the center to the corner nippers, but that the four middle ones are exactly alike, while the corners present a large, black cavity, without a distinct white edge to it, the dentine being generally encroached upon without any regularity in the concentric rings. Moreover, on comparing the lower with the upper nippers, unless the operator has performed on the latter also, they will be found to be

considerably more worn than the lower, the reverse of which ought naturally to be the case. Occasionally a clever operator will burn all the teeth to a properly regulated depth, and then a practiced eye alone will detect the imposition. In the present day there is not so great a demand for six-year-old horses as was formerly the case, and purchasers are contented with a nine or ten-year-old mouth, if the legs and constitution are fresh. Hence, bishoping is seldom attempted, excepting with horses beyond the age of eleven or twelve; and the mere use of the burning-iron without cutting off the teeth will seldom answer the purposes of the swindler. Formerly it was very common to see mouths with the corner nippers burnt to show a "good mark," and nothing else done to them; but, for the reasons given above, the plan is now almost entirely abandoned.

Irregularities in the growth of teeth are by no means uncommon in the horse, often caused by the practice of punching out the milk-teeth to hasten the growth of the permanent set. Instead of having this effect, however, the teeth are induced to take a wrong direction, and not meeting their fellows, they do not wear down as they naturally should. In punching out the corner nipper, it is very often broken off, and the fang is allowed to remain in the socket. The consequence is that the picking up of the food does not hasten the removal of the fang of the milk-tooth, and instead of accelerating the growth of the permanent tooth in the natural position, it retards it, and sometimes drives it to seek a passage through the gums behind its proper socket. Here, not meeting the corresponding nipper of the upper jaw, it grows like a tush, and has sometimes been mistaken for a second tooth of that kind. Some horses are naturally formed with "pig jaws"—that is to say, with the upper longer than the lower—and in these cases the whole set of teeth grows to a great length, interfering with the grasping of the food.

PART VIII.

VICES, UNSOUNDNESS, AND DISABILITIES.

I. Vices.—According to the best English authorities, vices for which horses may be returned, except no guarantee is given, are: Biting, when showing vicious purpose; bolting (the habit of running away); crib-biting, and rearing; kicking, when determinate, that is, vicious; restiveness, amounting to balking, or refusal to follow the direction of the driver; also shying, when chronic; backing or gibbing, and also weaving in the stable.

II. Warranty.—When a horse is bought, the warranty must be explicit and in writing, dated, with place, and properly signed. The following, to be correctly filled out, will cover the ground:

(City, State, and date.)

Received of (name) \$—— for (describe the animal, color, marks, and whether gelding, stallion, or mare), warranted —— years old, sound, free from vice, and quiet to drive or ride.

\$—— (Signature of seller.)

III. Unsoundness.—As to what should constitute unsoundness, Youatt and Walsh, both good English authorities, agree fairly in the following:

BOG SPAVIN, in a slight degree only.

A BROKEN KNEE, unless the joint is injured so as to impair its functions, is not considered to be unsoundness.

CAPPED HOCKS AND ELBOWS do not produce any lameness, nor do they in any way interfere with the action of the joints to which they are adjacent.

CONTRACTION OF THE FOOT is no evidence of disease, and, taken by itself, is not sufficient to prove it to be unsound.

COUGH, as long as it lasts. A horse with chronic cough is clearly returnable.

CURBS constitute unsoundness; but they must be shown to exist at the time of purchase, for a horse may throw one out immediately after he is transferred to the purchaser.

DISEASES, organic kind, in any of the internal viscera.

FARCY and GLANDERS. It is illegal in many States to sell a horse with glanders or farcy, the latter being the first stage of this disease, fatal to the horse and man.

FOUNDER, or LAMINITIS, whether it produces lameness or not, if it manifestly has existed, is to be accepted as unsoundness; for when there is evidence of its previous occurrence, the laminæ are injured so much as inevitably to lead to lameness when the horse is put to work.

MEGRIMS, when the attack comes on subsequently to the sale, and can be shown to have occurred before it.

A NERVED HORSE is unsound, from the existence of the disease for which the operation has been performed, as well as from the division of the nerves.

OPHTHALMIA, if it can be proved to have previously existed, and comes on soon after the purchase, is to be received as unsoundness. So, also, when any of the evidences of its previous presence can be detected, and are proved by a veterinary surgeon, the horse is returnable.

OSSIFICATION of any of the structures adjacent to the joints is unsoundness, and hence ossification of the lateral cartilages will be considered so, without doubt.

PUMICED FOOT, as evidence of laminitis.

QUIDDING and QUITTOR.

RINGBONES and SIDEBONES, whether large or small, are undoubtedly sufficient to constitute a horse unsound.

ROARING, WHISTLING, etc., as interfering with respiration.

RUPTURES of all kinds are decidedly unsoundness.

SPAVIN (bone), although it may not have occasioned lameness, if it is clearly the disease so named.

STRINGHALT has been decided to be unsoundness (*Thompson vs. Patterson*).

THICK WIND, as marking some impediment to respiration.

THRUSH, when it is in one of its severe forms, and not caused by mismanagement.

THICKENING OF THE BACK SINEWS, or suspensory ligament, when existing to any extent easily appreciable, is to be received as a proof of unsoundness.

IV. Disabilities.—These are bog spavin; broken knee, denoting a stumbler; capped hocks and elbows; contraction of the foot, if not from disease; curby hocks, cutting or interfering; splint, if it is so slight as not to produce lameness; thorough-pin, if slight, but not to be safely warranted; thrush, if simply from mismanagement; soreness of the joints, and windgalls.

V. Defective Laws of Warranty.—The law as to return of horses under warranty is not satisfactory in England; much less so in the United States. The better way, in the case of all animals worth over \$100, is to get the paid opinion of a regular veterinary surgeon. Major General Sir F. Fitzwygram says:

An excellent custom, not law, for there is no law on the subject, prevails in Ireland, namely, that the purchaser may take the horse to a veterinary surgeon of his own selection any time within forty-eight hours after the purchase; and that both parties are finally bound by his decision. If the purchaser neglects to do so, the bargain is nevertheless complete at the end of the above time.

As regards soundness, it is most earnestly recommended that the seller only give a warranty of the above description, namely, "sound, subject to the opinion, to be taken within forty-eight hours, of a veterinary surgeon selected by the purchaser;" and on the other hand, we would advise a purchaser not to ask for anything more.

It may however occur that the veterinary surgeon may recommend that a special warranty be given for a specified time on some particular points which he thinks suspicious. To such special warranty on any one point for a given time there seems no objection—either on the part of the buyer or of the seller.

Warranties are also given as to freedom from vice. These are very apt to lead to difficulty. A horse may be quiet with one person and troublesome with another. A horse may be quiet if properly exercised, and fractious if left in the stable and overfed. Again, a horse with a really perfect mouth will often show temper, and perhaps rear, if the rider is rough with the reins.

As regards the temper or vice, the intending purchaser ought to protect himself by riding or driving the animal, and ascertaining by such trial that he suits his hands and seat. Seeing a horse ridden by the dealer or his man is worth nothing. Horse-dealers, though they make a point of abusing their men and declaring that they have no "hands," in reality always provide themselves with good riders for the purpose of showing off their cattle to the best advantage.

In trying a horse, the animal should always be ridden both alone and in company. Many vicious horses go quietly along with another horse, especially with one to which they are accustomed, whilst others go quietly alone which are excessively unpleasant to ride along with other horses. The horse, when tried in company, should always be ridden

a little behind as well as in front of and alongside others. Some animals fidget all day unless they are in front, whilst others start and shy when in front, though quiet when ridden behind or with others.

THE FRENCH LAW OF WARRANTY.

In France, the law only gives relief in case of the appearance within a limited number of days of certain specified diseases or causes of lameness which were "latent," or, in other words, could not be detected at the time of purchase. It gives no relief in any cases in which the purchaser, by due caution or by employing a competent veterinary surgeon to examine the animal, might have protected himself. Such, at least, is the intended principle of the French law, though for reasons given below it seems to the writer to require some considerable modifications to bring its rules into complete harmony with its principle. The following is the text of the law:

LATENT DEFECTS WHICH CANCEL THE SALE OF HORSES IN FRANCE.

ARTICLE I.—1. Specific Ophthalmia; 2. Staggers; 3. Glanders; 4. Farcy; 5. Chronic affections of the chest or old achings in the limbs, *i. e.*, lumbago, rheumatism, etc.; 6. Inability to rein back; 7. Broken-wind; 8. Roaring; 9. Wind-sucking without using the teeth, *i. e.*, without crib-biting; 10. Intermittent inguinal hernia; 11. Intermittent lameness arising from old causes.

ART. II.—The time allowed for bringing the action to cancel the sale shall be exclusive of the day fixed for delivering the animal.

ART. III.—Thirty days shall be allowed in cases of specific ophthalmia and staggers.

Nine days in all other cases.

If the animal has been delivered, or if it has been taken away from the residence of the seller, the time allowed shall be increased at the rate of one day for every thirty-one miles of distance from the residence of the seller to the place to which the animal is sent.



PART IX

BREEDING AND THE BREEDER'S ART.

I. Wild vs. Domesticated Species of Animals.—Of the one hundred and forty-three or more species of animals at present known and classified, there are not more than forty-five domesticated, and this includes not only those quadrupeds generally understood as animals, but includes the various birds and insects, as bees, the silk-worm, etc. Those most valuable to man are the horse, ass, ox, sheep, swine, goat, and dog. Of birds, dung-hill fowls, the turkey, guinea-hen, goose, and duck. Of insects, the silk-worm, in its varieties. Just how animal nature has been broken up into the various families, subfamilies, species, and varieties is not necessary to our purpose here. Varieties and hybrids are what we are to consider; and also something as to the general laws of heredity in reproduction.

The horse is represented zoölogically by a single genus or family—*Equus*; and the different species, so far as known, as the ass, quagga, zebra, etc., are fertile together, and in some instances there have been produced fertile hybrids. The same may be said of the genus *Bos*, or horned cattle. For instance, the buffalo (bison of America), and also other species, where tried, have produced fertile hybrids when crossed by domesticated cattle. Those of the buffalo-cow and the domestic bull are said to have produced hybrids that were fertile. The production of hybrids can only be valuable so far as that between

the male ass and the mare, and these simply on account of constitutional vigor, freedom, generally, from disease, and remarkable for longevity. Here it is simply the ability to labor that makes them valuable.

II. Natural Species.—Species in nature are those forms with characters that remain constant from generation to generation, departing therefrom only within simple rules of variation, within the limits of their specific characters; and, the individuals of the species being capable of reproducing their kind, it follows, as a matter of course, that there would be nothing gained by hybridization, except in the one point stated; for, again, even if hybrids were perfect in fertility with one or the other of the parents, the end would be the ultimate reversion to one or other of the types used in the act of reproduction. In the case of plants, it is different. They are propagated by budding and grafting, and hence a hybrid once obtained; it may be propagated indefinitely by this means. Grafting can not reproduce animal species. It is also probably true that hybrid plants are more surely fertile than are animals.

III. Gestation and Its Period.—Gestation and its period ought to be thoroughly understood. The proper breeding age of animals is also a matter of importance. According to the observation of M. Teissier, a French observer, of five hundred and eighty-two mares which copulated but once—the observation extending over forty years—the shortest period was two hundred and eighty-seven days, and the longest four hundred and nineteen days. Here is a difference of one hundred and thirty-two days between the shortest and longest period.

The following table will not only show the gestation of the mare, but also other valuable tabulated matter:

We also find that individual mares exceeded the ordinary period of eleven months by eighty-nine days. The results of many observations by various observers show the proper age for reproduction, the period of the reproductive functions, the number of males to one female, the most favorable season for copulation, and the shortest, the mean, and the longest period of gestation and incubation of the various domestic animals.

A curious fact, not stated in this table, is that the turkey sitting on the eggs of the hen, and on those of the duck, hastened incubation by two days sooner than when the eggs were incubated by the species which laid the eggs. These figures represent the average powers of reproduction, and may be accepted as the proper average limits of perfect powers of generation in animals neither pampered nor starved.

IV. Influences Affecting the Progeny.—It is accepted generally that the male and female each furnish a quota to the formation of the embryo, and, proved by the fact that each is represented in the offspring, “Stonehenge” held, and to our mind correctly, that as the nutrition of the embryo entirely depends upon the dam, it may be expected that the health of the offspring and its constitutional powers will be more in accordance with her state than with that of the sire; yet, since the sire furnishes one-half of the original germ, it is not surprising that in externals and general character there is retained a *fac-simile* to a certain extent of him.

“Stonehenge” also says the influence of the male upon the embryo is partly dependent upon the fact that he furnishes a portion of its substance in the shape of a sperm-cell, but also in great measure upon the effect exerted upon the nervous system of the dam by him. Hence, the preponderance of one or other of the parents will in great

measure depend upon the greater or less strength of nervous energy in each. But we may state that no general law is known by which this can be measured, nor is anything known of the laws which regulate the temperament, bodily or mental power, color or conformation of the resulting offspring.

Our belief as to the influence of the two parents, reasoning from what we know of vegetable life, is that in the nourishment of the embryo the conditions are somewhat relative to the influence of the stock on the graft. A scion of any given variety budded or grafted upon an unhealthy stock will be unhealthy, and upon a strong, healthy stock it will cause the scion to grow strong and healthy. Hence, naturally weak-constituted varieties, but which are highly organized otherwise, should be grafted on exceptionally strong, healthy stock; and if it be necessary to suppress redundancy of growth, rather weak-growing stocks should be selected, but always free from any hereditary disease or disability. Thus, in the breeding of animals, since the dam must wholly nourish the foetus, the alimentary powers of the dam should be perfect, just as in the fertilizing of one plant by another. If we wish to give vigor of constitution, we select a highly organized male pollen to fertilize the pistil of a strongly constituted variety. This proceeding is always upon the assumption that the female function furnishes the internal organization, the blood and viscera in animals, while the sire gives the external form and appearance, purity of blood, and vital power. The same general temperament being alike, we may reasonably expect that there will be uniformity in the produce of animals properly coupled together.

V. Nicking and Intercirculation.—To return to the horse, the sire heavy, vigorous in vital power and nerve, the progeny when the two animals “nick,” as it is

termed, will resemble the sire in outward conformation more than the dam. This term "nicking" is simply a word used to express the reproduction of the best qualities of the parents in the progeny. Hence, when a good "nick" has been produced, the female should be confined to the same sire thereafter.

Why?

The writer is fully satisfied, from careful observation during a quarter of a century of breeding, that continued copulation of a sire to the same dam, year after year, intensifies the sire's integrity in the production of the young. We believe there is intercirculation of blood between the dam and the fœtus (to and from), and have never seen any thesis establishing the contrary.

Harvey's theory is that as the blood of the mother circulates in the veins of the fœtus, passed in for its nutrition and development by process of absorption and assimilation, so the blood of the fœtus must in some degree commingle with that in the mother's veins, forming a sort of general circulation; and that the fœtal blood is in part the blood of the male parent, and possesses elements and characteristics derived from him, the mother being, so to speak, inoculated with his blood and his peculiarities, and is "so engrafted into the system of the female as to be communicable by her to any offspring she may subsequently have by other males."

VI. Power of the Male.—We have always advocated, and acted upon, this doctrine of Dr. Harvey, and have become more and more confirmed in its truth from constant observation, notwithstanding the failure sometimes shown. Hence, animals escaping from domesticity soon assume a homogeneous character, from the blood of a single sire and dam, or few sires to many dams commingling, the law of nature being that the strongest

sire takes the females in season to the full extent of his powers. Not only this, but, in the case of gregarious animals, the powers of the male may be held for two or three generations, or until succeeded, through infirmity, by stronger sires. My individual practice, and substantiated by observation, shows that a dam bred year after year to one sire, not only produces young more and more like the sire, but that, in the course of years, the dam possesses the characteristics of the sire to a greater or lesser extent, and this from the constant intercommunication of the germ influence of the sire on the blood of the dam to growing foetus, and hence to the dam. Nevertheless, this need not be accepted positively, except by close observation of continuous facts to fortify or measurably annul.

SELECTIVE INFLUENCE.—The fact of similarity or abnormal influence through the power of imagination, influencing color, etc., is also worthy of continued and careful observation.

One idea prevalent among a large class of breeders is that, having brought a breed to a fair state of perfection, there is thenceforth little difficulty in keeping it so. Such, however, is not the fact. The greatest care in breeding is now necessary in the selection of sires and dams to perpetuate the highest type. To do so, the advanced breeder must possess the qualifications of those great breeders whose names are counted on a few fingers in a century. The sires and dams must continue to stand the most vigorous tests possible to be made in connection with the uses for which they are intended.

VII. General Laws of Breeding.—The general laws of breeding may be summed up in few words. The study and experiment to carry them out must be constant, and as varying as constant. The improvement of stock in some special lines, as in the trotting-horse and in dairy

cows, for instance; these have been intensified only within comparatively a few years. The full fruition of what has already been produced remains to be carried out.

In the production of grades, the principles involved in breeding require to be made known, for it is here that the average breeders are to be benefited. We believe that none but males of great constitutional vigor, and carrying the points required to be perpetuated, should be used, and once obtained, it should be continued indefinitely; that is in breeding grades, as much of this blood should be continued in the progeny by inbreeding, stopping short only when loss of vigor is shown in the offspring, and that, upon the introduction of new blood, the same general principle should be carried further in breeding of well-bred sires on the common stock of the country. In the case of pure breeds, or thoroughbreds, I have taken four impressions of a pure-bred sire upon his immediate descendants with continued improvement in the breeding of grades, resulting in progeny so strongly resembling the sire that they would grade equal to the pure stock, except in pedigree.

In this connection, it should be remembered that this sire was a phenomenal animal, uniting great vigor with large size, valuable muscular points, and the ability to impress upon his progeny, through the dams, his characteristics, and intensified by strong exercise, not only during the season of copulation, but continued moderately throughout the entire year.

VIII. The Value of Hybrids.—The longevity of hybrids seems to require a passing notice. Length of life, wonderful powers of endurance, and freedom from disease constitute the sole value of hybrids. Hence, except in the case of the produce of the ass and the mare, the breeding of hybrids has seldom been attempted. The only other case where it has been found of special value, so far

as my observation extends, is in the coupling of the male linnet with the female canary. The progeny, if male birds, shows great longevity, and is of unequaled powers of song. The females, of course, are destroyed, since the progeny is unfertile. Here, as in the case of other hybrids, the male impresses the form and general outward characteristics, including color. The produce of any two species of living creatures within a genus is a mule. The same rule holds good in vegetables. The produce of the male ass and mare we call a mule; that of the stallion and gennet, a hinny. They differ much in their characteristics. Each in its outward conformation resembles its sire, and this law of resemblance seems pretty well fixed in relation to hybrids of whatsoever kind, though not so constantly as held by Mr. Orton, an English authority, the same being modified from that of Dr. Alexander Harvey, and agreeing substantially with those of Mr. Walker, whose observations cover a much broader field of observation.

IX. A Law of Generation.—The conclusions of Mr. Orton, briefly stated, are, that in the progeny there is no haphazard blending of the parts or qualities of the two parents, but rather that organization is transmitted by halves, or that each parent contributes to the formation of certain structures and to the development of certain qualities. Advancing a step further, he maintains that the male parent chiefly determines the external characters, the general appearance, in fact, the outward structure and the locomotive powers of the offspring, as the framework, or bones and muscles, more particularly those of the limbs, the organs of sense, and skin; while the female parent chiefly determines the internal structures and the general quality, mainly furnishing the vital organs, *i. e.*, the heart, lungs, glands, and digestive organs, and giving tone and

character to the vital functions of secretions, nutrition, and growth; "not, however, that the male is without influence on the internal organs and vital functions, or the female without influence on the external organs and locomotive powers of their offspring. The law holds only within certain restrictions, and these form, as it were, a secondary law, one of limitations, and scarcely less important to be understood than the fundamental law itself." Mr. Orton relies chiefly on the evidence presented by hybrids, the progeny of distinct species, or by crosses between the most distinct varieties embraced within a single species, to establish his law.

The examples adduced are chiefly from the former. The mule is the progeny of the male ass and the mare; the hinny that of the horse and the she ass. Both hybrids are the produce of the same set of animals. They differ widely, however, in their respective characters—the mule, in all that relates to its external character, having the distinctive features of the ass; the hinny, in the same respects, having all the distinctive features of the horse, while in all that relates to the internal organs and vital qualities, the mule partakes of the character of the horse, and the hinny of those of the ass. Mr. Orton says:

The mule, the produce of the male ass and mare, is essentially a modified ass—the ears are those of an ass somewhat shortened; the mane is that of the ass, erect; the tail is that of an ass; the skin and color are those of an ass somewhat modified; the legs are slender, and the hoofs high, narrow, and contracted, like those of an ass. In fact, in all these respects it is an ass somewhat modified. The body and barrel, however, of the mule are round and full, in which it differs from the ass and resembles the mare. The hinny, on the other hand, the produce of the stallion and she ass, is essentially a modified horse. The ears are those of a horse somewhat lengthened; the mane flowing; the tail bushy, like that of the horse; the skin is

finer, like that of the horse, and the color varies, also, like the horse; the legs are stronger, and the hoofs broad and expanded, like those of the horse. In fact, in all these respects it is a horse somewhat modified. The body and barrel, however, of the hinny are flat and narrow, in which it differs from the horse and resembles the she ass. A very curious circumstance pertains to the voice of the mule and the hinny. The mule brays, the hinny neighs. The why and wherefore of this is a mystery, until we come to apply the knowledge afforded us by the law before given. The male gives the locomotive organs, and the muscles are amongst these; the muscles are the organs which modulate the voice of the animal; the mule has the muscular structure of its sire, and brays; the hinny has the muscular structure of its sire, and neighs.

Mr. Walker maintains that when both parents are of the same breed, that either parent may transmit either half of the organization; that when they are of different varieties or breeds (and, by parity of reasoning, the same should hold strongly when hybrids are produced by crossing different species), and supposing, also, that both parents are of equal age and vigor, the male gives the back, head, and locomotive organs, and the female the face and nutritive organs. To use his language:

When both parents are of the same variety, one parent communicates the anterior part of the head, the bony part of the face, the forms of the organs of sense (the external ear, under lip, lower part of the nose, and eyebrows being often modified), and the whole of the internal nutritive system (the contents of the trunk or the thoracic and abdominal viscera, and, consequently, the form of the trunk itself, in so far as that depends on its contents). The resemblance to that parent is, consequently, found in the forehead and bony parts of the face, as the orbits, cheek-bones, jaws, chin, and teeth, as well as the shape of the organs of sense and the tone of the voice.

The other parent communicates the posterior part of the head, the cerebral, situated within the skull immediately

above its junction with the back of the neck, and the whole of the locomotive system (the bones, ligaments, and muscles, or fleshy parts). The resemblance to that parent is, consequently, found in the back head, the few more movable parts of the face, as the external ear, under lip, lower part of the nose, eyebrows, and the external forms of the body, in so far as they depend on the muscles, as well as the form of the limbs, even to the fingers, toes, and nails. * * * It is a fact established by my observations that in animals of the same variety, either the male or the female parent may give either series of organs as above arranged; that is, either forehead and organs of sense, together with the vital and nutritive organs, or back head, together with the locomotive organs.

X. Modifications from Selection.—While it is a fact that like will produce like, and that this is a fixed law of nature, it is not controverted by *apparent* departures therefrom. In the act of domesticating an animal from the feral state, not only their natural instincts must be changed, but considerable physical changes ensue. Better feeding, peculiarities of exercise, care, and training, modify and permanently alter the structure. The animal at length becomes physically distinct, and reproduces these physical characteristics. Yet in all this there is no sudden departure, though the change from the feral may be a distinctive one, except in general characteristics. Hence the necessity that every part of the conformation of the animal be understood by the breeder.

We must be able to detect slight modifications in order to reproduce and still further build upon them, to organize and perpetuate either forms of beauty or utility. Selection, in fact, is the sheet-anchor in all improvement. Nevertheless, form is a no less important integer. Lord Rivers' answer, that he "destroyed many fine greyhounds in the breeding of many," gives the true idea. Dickson's saying, that "he will prove the most successful breeder who selects

with the most correct judgment," is as true to-day as it was one hundred years ago; and Fitzherbert, who wrote in the middle of the sixteenth century, simply voiced Columella when he stated that cattle taken from better pastures and brought to a "lean" one, "wyll not lyke with thee."

HEREDITY OF DISABILITY.

If domestic animals have not so good lungs and livers as wild ones, it is from lack of exercise, and, consequently, active digestion. It is not necessary that they have so ample lung-power except in the case of animals of labor or speed. Yet, since good lungs and digestion are the essence of value in animals, care must be taken that these important organs and their functions do not fall below the normal qualifications necessary to use. If so, it lays the foundation for all other disabilities, and these will result in hereditary disease or disability, such as scrofula, rheumatism, rickets, chronic cough, roaring, ophthalmia, grease, spavin, curb, etc. Youatt voiced what now has been generally found to be true when he stated that "there is scarcely a malady to which the horse is subject that is not hereditary—contracted feet, curb, spavin, thick-wind, blindness, notoriously descend from the sire and dam to the foal." The same is true of the other domestic animals. Scrofula, diseases of the brain and of the digestive and respiratory organs, are not uncommon in sheep. Epilepsy and rheumatism also occur. Swine are naturally prone to epilepsy and scrofula.

The aim of the intelligent breeder must now be directed to breed out this tendency to particular disabilities, both by the infusion of blood least tending in these directions, and by careful selection of young breeding animals. A strong integer here will be found in not allowing an animal to breed until mature, to cease breeding from them when they

have lost their full vigor, and to be sure that no breeding animals be kept in a state of quietude, on stimulating food. I consider full exercise for breeding animals among the most important of any of the principles leading to successful outcome. It is especially necessary in all animals of speed, if indeed it be not so in all that class of animals kept for their food products, since with these exercise has been most signally ignored.

XI. Production of Sex at Will.—Much has been stated, first and last, in relation to the production of sex at will. It may be as well to state that, so far, there is no direct evidence that the production of sex may be controlled in the slightest degree. The whole matter is mere theory, and not even founded on fact. The opinions of some scientific experts will show the truth of this statement.

Prof. A. J. Cook, of the Michigan Agricultural College, says:

As yet there is no known way to breed for sex. There is quite a general belief that there is an alternation of sex; that is, that if a cow gives birth to a heifer this year, she will probably bear a male calf next year. Doctor Sturtevant expressed the opinion a few years since that the breeder could control sex by taking note of this fact. He argued that the eggs alternated as to sex. Hence, if a cow bear a heifer this year, and one heat has passed before impregnation occurred, then a heifer would result next year. It is certain that there is a tendency to this alternation; but there are so many exceptions to it as a rule that we may well wonder whether it is more than this, that most animals bear about the same number of males and females; hence, if a male was last brought forth, a female will be more probable at next parturition. In buying cattle, I always like to know that the cow bore a bull calf last; then I expect a heifer next. So far I have never been disappointed.

Prof. J. W. Sanborn, of the Missouri Agricultural College, has no faith in any of the theories of breeding for sex.

"No living or dead man holds any secret or open knowledge of how to control sex. Prepotency sometimes is noted in animals, and varies with seasons, and may be due to physical causes or surroundings that affect either sex in vigor, etc. But while we observe these variations, no man and no accumulation of facts allow us to say that any procedure will bring this or that sex."

Prof. I. P. Roberts, of Cornell University, New York, goes more into detail in relation to this matter. He believes that the laws which govern sex in the progeny are little understood. He might have said they are not understood at all.

Sir Everett Howe believed the ovum to be sexless, and that the sex might not be confirmed until some time after copulation. It is the fact that sex is not shown in the very early foetal life, but this does not prove that the final determination of sex depends upon the potentiality given to the germ by one or other of the parents.

Mr. T. A. Knight was of the firm opinion that the female parent determined the sex of the offspring. M. Giron, after long and painstaking experiments, concluded that sex depends upon the relative vigor of the animals coupled. "While keeping large flocks of merino sheep some years since, in the West," says Professor Roberts, "I observed that nearly all of the lambs first dropped were males. As ewe lambs were more desirable, this caused some solicitude, but as the yeaning progressed the sexes were about evenly divided, and later on the females predominated; finally the few scattering lambs yeanned in June would be males. This was so common throughout the sheep district that every observing flock-master remarked upon it, and it was invariably explained by the fact that the rams, being more highly fed and fitted, were more vigorous than the ewes at the beginning of the breeding season; later on they were less

vigorous; finally, after the ewes were nearly all pregnant, the rams recuperated and were again more vigorous than the few scattering ewes that they met."

Some observations in France appear to show that ewes producing females are of a greater average weight than are those that produce males, and that they lose less in weight while nursing than the former. There is, without doubt, much reliable evidence which points unmistakably toward the government of sex by the parent having the greater vigor. It must not be forgotten that the hard-worked, lean female often has far more reproductive vigor than the more fleshy and pampered male.

With most wild animals, the progeny is the offspring of the strongest males, hence we might expect that males would predominate; but the other fact must be considered, namely, that the most vigorous females tend, as we have seen, to produce progeny of their own sex.

There is another theory which has found many believers in the United States. It is that after an animal has once conceived and borne progeny the sex may be governed by noting the desires of the female. If her last progeny be a male, her first desire, if bred, would produce a female, the second a male, the third a female, and so on. Closely allied to this theory is the one that in such animals as the cat and pig, which produce several young at a birth, each alternate swelling of the uterus produces progeny of the same sex; that is, if the sack next to the vagina produces a male, sacks three, five, and seven will; and sacks two, four, six, and eight will produce females. In the above case, if sacks two and four fail to conceive, then the progeny would consist of four males and two females. "This theory," says Professor Roberts, "has been proven, by investigations conducted on the University farm, to be totally unreliable."

After careful and painstaking observation, study, and inquiry, this gentleman is led to believe that the parent having the most healthy and the greatest sexual and physical vigor will, in a very large majority of cases, not only control the sex, but will transmit to the offspring its qualities and characteristics, be they good or bad, in more marked degree than the parent having qualities less vigorous and healthy. In all other respects except sex, we all admit that the stronger blood governs to a greater degree than the weaker; and what is stronger blood but improvement, by improved environments and selection, of the best? and the best is always the most vigorous in the qualities which we most desire to perpetuate and improve.

If we desire trotters, or beef, or milk, we select animals which are most vigorous in these respective directions, expecting improvement in the offspring though coupled with animals inferior to themselves. Failure to realize expectations is usually due to want of knowledge or judgment. If, then, superiority controls more largely than inferiority in all other directions, why not in the direction of sex?

Nevertheless, the whole subject is mere theory since none of these experiments have been verified.

PART X.

COMMON DISEASES OF THE HORSE.

I. Diseases of the Eyes.—In all specific diseases of the eyes, it is best to call a veterinarian. For inflamed eyes, the result of some foreign substance getting therein, an effective and simple remedy is to raise the eyelid and blow a very little finely granulated sugar against the eye and immediately drop the lid. For constitutional diseases of the eye, little or nothing can be done. The veterinarian, if called in, will be able to indicate the treatment that may be available.

As indicative of temper, intelligence, etc., however, the eye of the horse is very striking. The illustrations, Figures 1, 2, 3, 4, will give a good idea of the organ:



Fig. 1.
Watchful and Timid.



Fig. 2.
Honest Eye.



Fig. 3.
Low-bred.

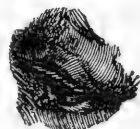


Fig. 4.
Pig-eyed.

So far as the treatment of common diseases is concerned, we propose to cover the list, generally, as to those requiring extended explanation, from the newest and best authorities extant, giving credit to the authorities consulted. Among the later works distinctively on the horse is the thick volume of Major-General Sir F. Fitzwygram, Bart., who has contributed largely in his printed works, in

England, to practical veterinary literature in its various departments. The extended descriptions of diseases will largely be taken from his late valuable writings, as given in the following, unless otherwise noted:

II. Distinctive Coughs.—These may be divided into seven classes, namely:

1. The hard, dry cough, which arises from dryness of the membrane of the air-passages. It is found in the early stage of inflammatory attack.

2. The moist cough, which marks the second stage of an inflammatory attack, when the inflamed membrane has again begun to throw out secretions.

3. The rattling or wheezing cough, which is found when the windpipe is choked with mucus.

4. The soft, suppressed cough, which marks the presence of inflammation in the lungs; and a suppressed, but somewhat harder cough, which denotes inflammation in the pleura. The peculiar suppressed character of these coughs is due to the pain which the act of coughing produces on account of the inflamed state of the lungs or pleura.

5. The chronic cough, which is usually dry and short, and (except when associated with broken-wind or roaring) of an intermittent character, indicates alteration of structure or confirmed irritability of some portions of the respiratory organs.

6. A short, hollow, weak, asthmatical cough, which is peculiar to broken-wind.

7. A deep, hollow cough, which is generally found to accompany roaring.

III. Catarrh, or Common Cold.—(*a.*) *Symptoms.*—The premonitory symptoms are loss of appetite, dullness of the eye, staring of the coat, a tendency to sweat upon

slight exertion, and a little watery discharge from the nostrils. These are followed by slight feverishness, slightly quickened pulse and somewhat hurried breathing, and a hot mouth. The bowels are usually constipated. In most cases, the throat is more or less sore.

If the disease runs on, the glands under the jaw become inflamed and swollen from sympathy with the inflammation existing in their neighborhood. If the throat become positively sore, laryngitis may be said to have supervened.

(b.) *Treatment.*—The treatment required in the first instance is simply removal to a cool, loose box, with abundance of fresh air, extra warm clothing, flannel bandages to the legs, deprivation of grain, warm mashes, and laxative diet. With proper care, no case of incipient catarrh ought ever to be allowed to develop itself into any serious mischief. A very few days will in general see the patient restored to health.

If, however, the running at the nose is considerable and the cough troublesome, it will be advisable to steam the head frequently during the day; and if the patient becomes feverish, a dose consisting of half an ounce of sweet spirits of nitre and two drams of nitrate of potassa may be given once or twice a day for two or three days. Active purgative medicine in this, as in all diseases in which the respiratory organs are affected, is wholly inadmissible; but if the bowels are constipated, instead of the previous medicine a dose consisting of two ounces of Epsom salts with half an ounce of nitrate of potassa may be given twice a day until the desired effect is produced. If there is depression, with staring coat and unequal heat in the legs, one ounce of spirits of nitric ether and four ounces of acetate of ammonia may also be administered, in a pint of water, morning and evening.

Catarrh, if neglected, readily runs into laryngitis, bronchitis, pneumonia, or other disease of the respiratory organs. In some few cases it becomes chronic, and is then known as nasal gleet.

IV. Laryngitis and Sore Throat.—The seat of laryngitis is in the membrane covering the upper part of the larynx, or box of the windpipe. When the pharynx, or back part of the swallow, is affected, the disease is termed sore throat. Both affections proceed from inflammation of the mucous membrane of the parts, and as both parts are usually affected at the same time, they generally exist in combination, and we may therefore, for practical purposes, treat these affections as one disease.

(a.) *Symptoms.*—The earliest symptoms of laryngitis combined with sore throat are cough and difficulty of swallowing solids, or even liquids. The mouth is hot, and the horse is disinclined to eat, or perhaps “quids” his hay, *i. e.*, lets the masticated hay fall out of his mouth. He only sips his water, or takes it by small mouthfuls. The region of the gullet and fauces is hot and tender, and the least pressure on it often produces a paroxysm of coughing. The salivary glands throughout are swollen and tender. The difficulty in swallowing arises from the irritated state of the membrane at the back part of the palate, over which the food must pass. The horse also uses much mastication, in order to produce an amount of saliva which may shield the irritated membrane during the passage of the food. Hence we find much slobbering from the mouth, and frequently, in bad cases, when the animal drinks, a portion of the water comes back through the nostrils, and occasionally part of the food is returned in the same way. The cough peculiar to this disease is distinguished by its evidently proceeding from the top of the windpipe, and further by its being sharp and troublesome, not suppressed as in pneumonia.

The pulse is quick and the respiration somewhat hurried. If the disease is not checked, the cough will become very hard and harassing, and we may expect fever to supervene. Fever, however, is only a concomitant symptom, and our attention must not be diverted to it from the real disease. The fever will subside as soon as the irritation which causes it is removed.

(b.) *Treatment.*—In the earliest stage, the treatment consists in removing the patient to a loose box with an abundant supply of fresh air. The diet must be restricted to soft food. The horse should be fed from a temporary manger, placed so as to suit the height at which in this disease he generally carries his head. Grass is by far the best food; but when it can not be procured, carrots, or bran-mash, or linseed gruel may be substituted. Hay is wholly inadmissible, as it can not be properly masticated, and its long, dry fibres will be certain to cause irritation in the throat.

Active purgative medicine is injurious in this as in all other diseases of the air-passages, because the patient's strength always fails very rapidly from want of due purification of the blood in the lungs; and therefore he can not bear any such lowering treatment. Aloes, in particular, on account of sympathy between the inflamed mucous membrane of the throat and the mucous membrane of the bowels, is very apt to produce super-purgation.

If it is desired to produce a slight action on the bowels, two ounces of Epsom salts may be given morning and evening for two or three days, in a pint of water, with two drams of ginger. If the salts do not act on the bowels, they will do so on the kidneys. A tablespoonful of common salt may also, with advantage, be mixed in a bran-mash. It will make the patient thirsty, and cause him to drink more freely.

Febrifuges, in the form of small doses of half a dram of belladonna and an ounce of nitre, made up into a soft ball or dissolved in water, may also be given.

A stimulant, such as mustard, or mustard and ammonia, may be beneficially applied to the throat and upper portion of the trachea, with the view of rousing the parts to a new and healthier action. When the disease is complicated with strangles, the persistent use of warm poultices or fomentations to the throat, and the opening of any tumors or abscesses as soon as they begin to point, will assist in allaying the inflammation.

The strength must be supported as much as possible by careful attention to the appetite and good nursing. Grass, carrots, or warm mashes may be offered in very small quantities at a time. Demulcent drinks, such as linseed-tea, hay-tea, or gruel, are useful and often acceptable. Water should always be within reach.

Steaming of the head with the vapor arising from boiling water poured on hay in a bucket is generally very beneficial. If there is much irritability of the membrane, it will be advisable to pour four ounces of chloroform or chloric ether on the hay. The patient will inhale it along with the steam. In many cases the effect of this treatment in allaying irritation is very marked.

Should the steaming apparatus appear to distress the animal, it must be used only for a limited period, and be



Eight-tailed Bandage.

reapplied after its effect has subsided. To aid its operation, take soft hay, soak it in boiling water, and fix it upon the throat by means of an eight-tailed bandage, a representation of which is given. To make this, take a piece of stout

flannel, one yard and a quarter long and nine inches wide. Three slits are to be made at either end, each a quarter of of a yard deep. This is placed round the throat and the ends tied, four in front of and four behind the ears.

The warmth of the body must be maintained by clothing, and the legs should be wrapped in flannel bandages. At intervals, according to the circumstances of the case, the bandages should be removed and hand-rubbing applied until warmth is restored.

Another, and it is very good practice when it can be managed, but there is often a good deal of difficulty in effecting it, consists in cauterizing the inflamed membrane by applying to it a sponge, neatly tied on the end of a stick, saturated with a solution of twenty grains of nitrate of silver to an ounce of water. The attack, if taken in time, may often by this means be cut short. The horse's mouth must be kept open by means of a balling-iron whilst the operation is performed.

(c.) *Signs of Recovery.*—The first sign of recovery is a slight mucous discharge from the nostrils, indicating that the inflammatory action is subsiding. There will also be some slobbering of saliva at the mouth, and the cough will become softer; and the mucus discharged from the inflamed surfaces will be coughed up and got rid of, partly by the nose and partly by the mouth, and in due time the cough will cease. The swelling of the parotid glands and of the glands under the jaws will also gradually subside. The concomitant fever mentioned above will cease of itself along with the irritation which produced it.

(d.) *After-treatment.*—The after-treatment will need much care and attention. Some deposit on or thickening of the membrane generally remains after the attack has subsided, which may cause the horse to become a roarer; and in order to assist nature to remove it, and thereby

lessen the chance of any affection of the wind, it is advisable to apply a strong blister of biniodide of mercury. Mineral tonics may also be given. (See recipes.) The patient should remain in a cool, loose box until all irritation has completely passed away.

Again, when the horse is thoroughly convalescent, the owner must not be in a hurry to get him into fast work, because the membrane of the larynx and pharynx will continue to be for some time very susceptible to irritation and inflammation. Great attention must also be given to the ventilation of the stable.

When the discharge from the nostrils continues for a length of time, even after the horse has in other respects recovered, the case must be treated as one of nasal gleet. In this case apply to a veterinarian.

V. Bronchitis.—The first positive sign of bronchitis is indicated by a quickened breathing, accompanied with a slight whistling or hissing sound heard on auscultation at the sides of the chest, or else by a deeper and more noisy sound in front of the chest. The whistling sound is technically known as sibilus, and marks inflammation of the smaller tubes; whilst the deeper sound indicates inflammation of the larger tubes. The peculiarity of these sounds arises from the passage of the air over a dry, inflamed membrane in the tubes. During this, or the "dry stage," the pulse is harder and quicker than natural, and as the disease progresses it becomes quicker and smaller, until in very bad cases it can be no longer felt. The breathing is also much quickened, and the membrane of the nostril is red and inflamed.

Increase of the attack is marked by hurried breathing, dilatation of the nostrils, heaving of the flanks, much fever, a highly inflamed state of the Schneiderian membrane, and rapid prostration of the strength. A peculiarity of the

breathing may also be noticed, namely, that the act of inspiration is performed with difficulty, whilst that of expiration is effected with comparative ease. The breathing also may be quicker than the pulse.

In pure bronchitis the throat is not affected. The disease is in the bronchial tubes, either great or small, but not in the larynx or trachea. If, however, bronchitis supervenes on a previous attack of catarrh or sore throat, the larynx and trachea will necessarily be involved.

The causes of bronchitis are similar to those of catarrh and sore throat.

(a.) *Treatment*.—At the very earliest symptom, the patient should be removed to an airy, loose box, warmly clothed, bandages applied to his legs, and his food restricted to grass, carrots, or bran-mash. If the legs are unequal in warmth and the coat is inclined to stare, it will be advisable to give an ounce of spirits of nitric ether, with four ounces of acetate of ammonia, in eight ounces of water both morning and evening, and a ball consisting of two drams each of resin, nitre, and antimony. If these precautions are taken sufficiently early, the threatened attack will probably be averted. A good servant will always notice the slightest deviation from health in the horses under his charge, whilst careless, ignorant servants seldom see anything wrong until disease has fully established itself.

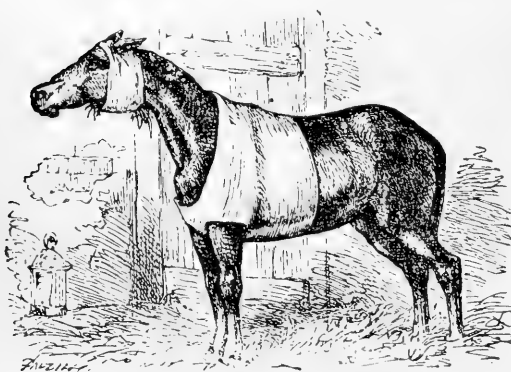
If, however, the attack is not averted, some sedative medicine will be needed, such as from five to ten drops of Fleming's tincture of aconite every four hours; but this medicine must not be continued after the pulse has become soft, which in favorable cases is usually in about twenty-four hours. If aconite does not produce the desired effect in that time, its use should be discontinued. Its action on the system, though beneficial for a certain purpose and at a certain time, is too lowering to admit of prolonged use.

After a time the pulse usually becomes weak and the patient is prostrated. Diffusible stimulants, such as carbonate of ammonia in doses of one dram, or sweet spirits of nitre or sulphuric ether in doses of half to one ounce, repeated every four or six hours, are now needed, and may be continued until signs of relief are apparent. If the horse is inclined to drink, half an ounce of nitre may be dissolved in each half-pailful of water until the kidneys are freely acted on.

Inhalation of the steam arising from boiling water poured over hay will also be found to give much relief, and should be made a main point of treatment. The steam relieves the irritated membrane and tends to loosen the mucus, and thereby relieves the cough. A small quantity of chloric ether may also at intervals be poured on the hay, and will assist the above effect.

Mayhew advises dressing the horse as follows:

Some scalded hay is to be fixed under the throat by



Dressed for Bronchitis.

means of an eight - tailed bandage. A mackintosh (waterproof) jacket is then laid on the floor, and the horse gently led forward till one leg rests within one armhole; the opposite

leg is to be raised and put through the other opening. The cloth is next lifted up and temporarily fixed upon the

animal. Afterward, have six pieces of flannel, two three yards long and the entire width of the fabric, the others half a yard long and a foot wide. Saturate three of these with cold water; having folded the long piece, apply it over the back, equally to either side; the short pieces place upon the sides of the chest; fasten the jacket over the spine. When the flannel is warm, remove it; replace it immediately with other flannels, which should be ready for this purpose. Do this continuously for at least a couple of hours, after which time the flannel may remain on, but must on no account be suffered to become dry. The jacket and flannel should be worn for a week subsequent to restoration.

Aloes and strong purgatives are inadmissible. If the bowels are constipated, two ounces of Epsom salts with half an ounce of nitrate of potassa may be given twice a day until a slight effect is produced. In some few cases there may be yellowness of the eye and of the membrane of the mouth. This will be found to be caused from overaction of the liver. No treatment is required.

When, as is often the case, notwithstanding hand-rubbing and bandages, the legs remain persistently cold, the best plan is to apply ammonia liniment to them and then to replace the bandages.

In addition to the above treatment, the front part or the sides of the chest should be stimulated with mustard. As soon as the irritant effect of the mustard has ceased, which will be in about fifteen minutes, it should be washed off. In about two hours the application may be repeated, and again washed off as before; and this process may be repeated at intervals until signs of relief are apparent.

If signs of recovery do not become apparent, the disease will probably extend to the lung tissue or to its covering membrane, and we shall probably have the case

complicated with pneumonia or pleurisy. A horse may die of pure bronchitis, but in fatal cases the disease generally runs into pneumonia or pleurisy before death. If these complications arise, send for a veterinarian.

(b.) *Signs of Recovery.*—Nature, assisted by the above remedies, generally brings about a favorable change in a few days. The pulse, although still quick, becomes more distinct, the breathing more tranquil and regular, the feverish symptoms decrease, the cough becomes of a stronger character, and there is a discharge of mucus from the nose. The membrane lining the nostrils assumes a more natural color, the mouth feels more moist and cooler, the animal lies down comfortably, and the appetite returns. Sometimes a slight diarrhea is the turning-point of the disease, and it is not advisable to check it unless it becomes severe.

(c.) *After-treatment.*—The nasal discharge should be encouraged by steaming the head. In some cases, the collection of the mucus in the bronchial tubes, notwithstanding the subsidence of the acute attack, is very troublesome; and the breathing becomes heavy and accompanied with a wheezing noise, especially when the animal coughs. The steaming recommended above will assist in its removal, and in due time the mucus will be got rid of by coughing, and then the cough will cease. The body and the legs must be kept warm by clothing and bandages, whilst the box should be freely ventilated. Good nursing of the patient in every way is of primary importance.

VI. Pneumonia, Pleuritis, and Pleuro-pneumonia.—These diseases are cognate in their causes and nature; hence the treatment required is also very similar.

When any of the premonitory symptoms, such as slight catarrh, feverishness, dullness, or loss of appetite, appear, we must at once have recourse to an abundant supply of cool, fresh air, abstinence from grain, laxative diet, entire

rest, extra clothing, and warm bandages to the legs. In all cases, it is desirable that the patient should at once be removed to an airy, loose box. Diffusible stimulants are also beneficial.

If these simple remedies do not altogether avert, or at least bring about subsidence of the attack within a very short time, we must have recourse to medical treatment.

(a.) *Treatment of the Attack.*—During the first, or dry stage, sedatives, such as from five to ten drops of Fleming's tincture of aconite, may be given every four to six hours, if the fever be high (but not otherwise), until relief, as indicated by the pulse becoming softer in character and lower in number, is obtained.

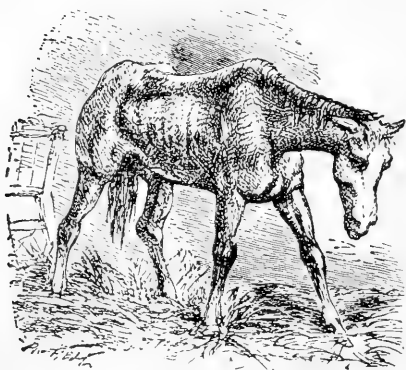
Neutral salts dissolved in water have a marked effect in relieving the breath. For this purpose, two ounces of sulphate of soda or one ounce of nitrate of potassa may be dissolved in a pailful of water, and the patient may be allowed to drink as much as he pleases. If he finishes the pailful, another may be given him. If the bowels are constipated, as is often the case, two ounces of Epsom salts dissolved in water with half an ounce of nitrate of potassa may be administered twice a day.

If the legs, notwithstanding friction and bandages, remain persistently cold, a mustard plaster may be applied to them, and washed off after fifteen minutes and the bandages reapplied, or they may be rubbed with turpentine liniment.

Diffusible stimulants, which were recommended above during the premonitory symptoms, are not suitable during the dry stage, or at least during such portion of it as aconite is administered with the view of lowering the pulse. But when the strength begins to fail, as is often the case after the dry stage has continued for some time, and during the second or moist stage, diffusible stimulants, such as

carbonate of ammonia in doses of from one to two drams, combined with small doses of gentian and ginger once or twice a day, or half an ounce of sweet spirits of nitre repeated every four or six hours, are very beneficial, and may be given from time to time, as may be required.

During both the dry and the moist stage, much relief will be afforded to the internal organs by stimulating frequently the sides and chest, though on each occasion mildly, with mustard and ammonia. The stimulating effect



Aggravated Pneumonia.

caused by these agents is produced very rapidly. It will be sufficient to allow them to remain on the skin about ten or fifteen minutes, after which they should be washed off. If the mustard is allowed to remain on longer, it loses its stimulating action and is apt to be absorbed into the system, where

it will act injuriously. When the effect of the stimulant has passed off, say in a couple of hours, it may be repeated, and again washed off as before. These applications may be used occasionally, if relief appears to be gained by them. If ordinary household mustard, which is usually largely adulterated with flour, be used, half a pound, or about that quantity, will be required at each application; but if the mustard is pure, about two-thirds of that quantity will be sufficient. In these cases, however, as in most others, much must be left to the discretion of the attendant, who ought to watch the symptoms and the effect produced.

The skin of some horses is much more easily acted on than that of others.

As the disease progresses, sustain the strength of the patient as far as possible by giving soft, nutritious food, by most attentive nursing, and by warmth applied to the body by means of clothing, etc.

It is necessary to call particular attention to the distinction in regard to diet which exists between the premonitory and the later stages of the attack. In the former, the patient must be deprived of all grain and fed on laxative diet. Such timely measures, combined with a loose box, will probably ward off the impending attack, or at least prevent its becoming serious; whilst, on the other hand, when the disease has fairly established itself, the strength of the patient needs to be sustained, in order to enable him to throw it off and survive its debilitating effects. When, however, the disease has established itself, the appetite always fails, and the difficulty is to get the patient to take any nutriment. His appetite must be tempted by whatever may seem at the moment to be palatable. A handful of sweet grass, a carrot or two sliced lengthways, or a few mouthfuls of bran-mash or of oatmeal gruel, made fresh as required, or a few bruised oats, may be tried. Skim-milk at this stage will be found very useful in sustaining the strength.

As a general rule, these diseases terminate quickly and favorably, and without any after injurious effects, when treated as recommended above. It is only when the system is unduly lowered, or the fever is aggravated by the use of violent blisters, that we have reason to fear an unfavorable termination.

VII. Strangles, Generally Called Distemper.—

In the beginning, the horse is sick and off his feed, and perhaps has a slight catarrh, with feverish symptoms. In

a day or two, the glands under the jaw or behind the ear begin to swell. Partly from the effect of the fever which accompanies the attack, and partly from sympathy, the throat also becomes sore; and hence arises difficulty in swallowing, with much slobbering and some acceleration of the breathing.

When the tumor forms, and is of the ordinary size, the abscess generally comes to maturity without much trouble or inconvenience.

If, however, the tumor is situated high up toward the parotid glands, the distress in the breathing will often be very great, and the feverish symptoms will run high. The



Strangles, Characteristics.

noisy breathing which forms so marked a feature in most severe cases, and from which the disease obtains its name, is owing partly to the tumor, formed in the neighborhood of the parotid glands, pressing

on the larynx, and partly, also, to the inflamed and swollen state of the lining membrane of the larynx, which becomes inflamed by sympathy. The tumor often becomes exceedingly large, and the patient may get excessively weak from being unable to masticate his food. In some cases, the animal may be in danger of suffocation from obstruction of the breathing caused by the size and situation of the tumor.

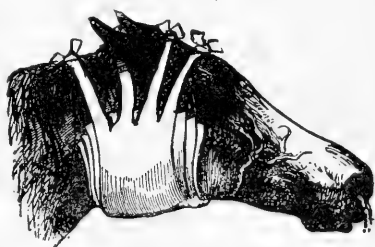
Again, from general derangement of the secretions of the body, owing to the eruptive disease existing in one part, the pores of the skin cease to act properly, and, in consequence, the skin becomes dry and the coat is harsh and staring.

(a.) *General Treatment.*—As usual with eruptive diseases, strangles runs a specific course. The great object in treatment is to assist nature to develop the eruption fully and quickly. If the eruption is checked in the external part, in which it usually first appears, it is very apt to fly to another, and perhaps to some internal glandular structure.

Hence, instead of treating this disease with depletives, as some of its symptoms, and especially the fever, might seem to indicate, we must endeavor to keep up the strength of the patient.

Herein, however, lies the chief difficulty. The horse is sick and not inclined to feed. His throat is sore, and at best he can take nothing but soft food. Hence, good nursing becomes the main point in the treatment.

The patient's appetite must be carefully watched, and tempted with anything that he will eat. In bad cases, grass is not only the best, but is often the only food that the animal can be tempted to swallow, or to attempt to swallow. Carrots, cut lengthways, are the best substitute, when grass can not be obtained. Bran-mash is sometimes palatable for a day or two, but, in general, it soon becomes distasteful. Linseed gruel may also be offered. If the patient is able to eat it, he should be supplied with ground feed, softened by boiling water being poured over it, with the addition of bran and linseed. Whilst it is desirable to give the animal whatever he will take, it is also necessary that the food should be offered him in a softened condition. Hay, put into a bucket and boiling



Dressed for Strangles.

water poured on it, is also palatable. The steam arising from it will also be found to be beneficial by soothing the inflamed surfaces.

Warm clothing must be applied to the body and bandages to the legs. At intervals, if the legs get cold, the bandages should be removed and the parts rubbed with the hands until warmth is restored. The patient should be placed in a cool, well-ventilated box, with abundance of air both day and night. Cool, fresh air in this, in common with all diseases in which the respiratory passages are affected, is of the utmost importance.

If the bowels are constipated, they must be relieved by the use of laxative food, or, if need be, by injections; but no strong purgative medicine must be given, both for fear of checking the eruption and also on account of its tendency to reduce the strength and perhaps bring on super-purgation. If any medicine is needed, half a pint of linseed-oil may be given, and repeated after twenty-four hours, if necessary.

The fever which accompanies the eruptive attack will disappear as soon as the disease has run its course. Should it, however, be excessive, it may be advisable to allay it with ordinary febrifuges, but no lowering treatment is admissible. (See Febrifuges).

(b.) *Treatment of the Local Swelling.*—In the treatment of the local swelling, the object must be to induce the process of suppuration or formation of matter. Keep the part warm with layers of flannel. Fomentations do not answer well, because a chill, which may check the formation of matter, is apt to supervene when the fomentation is discontinued, as it must be at times.

If the suppurative process needs further assistance to bring it to maturity, a poultice of boiled carrots or turnips applied to the part, and retained in its position by an eight-tailed bandage, will be beneficial.

Blisters have been recommended, but are objectionable, in the early stage, at least, because they tend to disperse the swelling, instead of developing the abscess. When, however, the tumor has begun to soften, a light blister will assist in bringing on the desired action, in cases where the progress is unduly tardy.

(c.) *Opening the Abscess.*—When a tumor is pointing externally, it should be opened, as soon as it is nearly ready to burst, at its most depending point, so as to afford the best and freest exit for the matter. It is better to open the abscess than to leave it to burst, because the opening may be made at the most favorable point, and because incised wounds heal more rapidly than irregular openings, and are also less liable to leave a blemish.

The incision must be kept open, and the abscess occasionally injected for a few days with warm water by means of a syringe, in order to clean away any matter which may be adhering to the sides. Or a small piece of tow may be put into the opening and removed occasionally to prevent the wound closing too soon.

But when the abscess is deep-seated, great caution is necessary in the operation, for fear of injuring with the lancet any of the blood-vessels in its neighborhood. Any considerable flow of blood may prove fatal to an animal already in a weak and debilitated state; and again, if the lancet should cut through the duct of the salivary gland, we may have a very troublesome fistulous sore, discharging saliva. The operation should not be attempted unless the pressure of the tumor produces great distress in breathing, or unless it is so situated that it is probable that the pus which will escape on its bursting internally will cause suffocation. If we can gain time for a day or two, the abscess will probably point, and may then be opened with safety.

Before operating, the back part of the mouth should be examined by the hand. The tumor may probably be felt, and perhaps the pressure of the finger may cause it to burst into the fauces. In such case, there will be considerable temporary distress in the breathing and a profuse discharge of matter through the nose and the mouth, after which there will be immediate relief, and the animal will get well. Occasionally a tumor so situated will burst of itself, probably during a fit of coughing, with similar results.

Occasionally it happens that the tumor is so placed on the side of the throat that by pressing on the windpipe it causes extreme difficulty in breathing. In such cases, it may be necessary to open it, even though not fully matured; and if it can be laid well open with safety, the operation will give relief. In extreme cases, relief to the breathing can only be obtained by opening the windpipe by the operation known as tracheotomy. Though the glands about the head are the usual seat of the tumor, yet abscesses may, as mentioned above, form in any of the glandular structures.

If the tumor should form in any of the internal glandular structures, such as the mesentery, liver, or lungs, it will probably be fatal. During life, we can not be certain of its existence in any such situations. We can only surmise it by the symptoms, namely, low fever and emaciation. We must, in such cases, trust to nature; but, whilst we trust in her, we must do all we can to assist her powers by sustaining the system by generous diet and good nursing; and we must especially avoid any treatment, such as the administration of purgative medicine, which would lower and debilitate the system.

The tumor of strangles may also form in different parts of the body apart from the glandular structures, as, for instance, on the shoulders, in front of the chest, etc.

(d.) *After-treatment.*—The after-treatment consists simply in the continuance of good nursing and careful attention to appetite, diet, and ventilation until the strength is restored. The patient in general recovers rapidly; but if he is much debilitated, vegetable followed by mineral tonics will be beneficial.

VIII. Influenza.—Herbert, in "The Horse in the Stable and the Field," says of influenza:

This may be considered to be an epidemic catarrh, but the symptoms are generally more severe and leave greater prostration of strength behind them. They also require more careful treatment, which must be specially adapted to the attack, for remedies which will arrest the disease in one year will totally fail the next time that the epidemic prevails. The fever of late years has had a tendency to put on the typhoid type, and bleeding, which formerly was often beneficial, is now completely forbidden. The symptoms are at first similar to those already described as pertaining to common catarrh, but after a few days the accompanying fever is more severe than usual, and does not abate at the customary period. The appetite is altogether lost, and the appearance of the patient is characteristic of severe disease rather than of a trifling cold. It is, however, chiefly from the fact that a number of horses are seized with similar symptoms, either at the same time or rapidly following one another, that the disease is recognized. It usually prevails in the spring of the year, or in a wet and unhealthy autumn. Sometimes almost every case runs on to pneumonia, at others the bronchial mucous membrane alone is attacked; but in all there is extreme debility in proportion to the apparent nature of the disease. The ordinary appearances exhibited in recent epidemics have been as follows: The first thing observed is a general slight shivering, accompanied by a staring coat. The pulse is weak, and slightly accelerated, but not to any great extent; the mouth feels hot; the eyes and the nostrils are red; the belly is tucked up; there is no appetite; cough, to a varying extent, begins to show itself, and there is generally a heaving of the flanks. The legs and feet are not cold as

in pneumonia, but beyond this they show no positive signs. The cellular membrane around the eyes, and of the legs, generally swells about the second day, and often the head and limbs become quite shapeless from this cause. In the early stage, the bowels are often relaxed, but afterward they are as frequently confined. Sore throat is a very common complication, but it is not by any means an invariable attendant on influenza. It is, however, somewhat difficult to ascertain its existence, as in any case there is no appetite for food. The treatment should be conducted on the principle of husbanding the strength, and, unless urgent symptoms of inflammation show themselves, the less that is done the better. If the trachea or larynx is involved only slightly, counter-irritation, by means of a liquid blister, must be tried, without resorting to strong medicines; but if serious mischief ensues, the case must, to a certain extent, be treated as it would be when coming on without the complication of influenza, always taking care to avoid bleeding, and merely acting on the bowels by gentle aperients, and on the skin and kidneys by the mildest diaphoretic and diuretic. (See recipes.) The following is the ordinary plan of treatment adopted:

Take of Spirit of Nitric Ether	1 ounce.
Laudanum	4 drams.
Nitrate of Potassa	3 drams.
Water	1 pint.

Mix, and give as a drench night and morning.

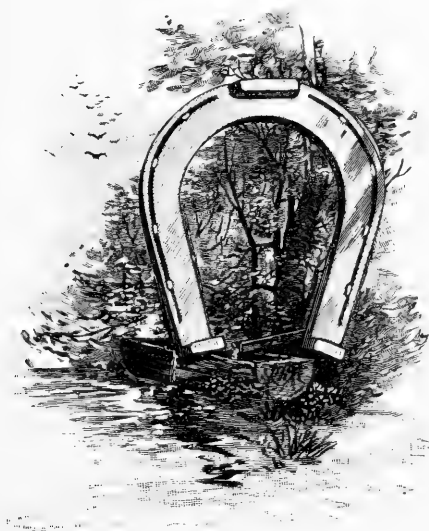
By constantly offering to the horse thin gruel (taking care that it does not become sour), and no plain water, sufficient nourishment may be given, as his thirst will induce him to drink.

During the stage of convalescence, the greatest care must be taken. At first, as soon as the cough has somewhat subsided, a mild stomachic ball will be desirable, such as—

Take of Extract of Gentian	6 drams.
Powdered Ginger	2 drams.
Mix.	

Afterward, if the case goes on favorably, and the appetite returns, the restoration may be left to nature, giving the horse by degrees his usual allowance of grain,

and adding to his morning and evening feed one dram of sulphate of iron in fine powder. It must not be attempted to give this until the appetite is pretty keen, or the horse will probably refuse his grain altogether.



PART XI.

DISEASES OF THE STOMACH AND INTESTINES.

I. Signs of Colic.—Fitzwygram, to whom we now return, says:

The early sign of colic is pain, evidently in the region of the intestines, as indicated by the horse looking anxiously round to his flanks. As the pain increases, the patient will knock about, lie or throw himself down and get up again frequently, or roll over, or kick. The nature of the disease is further recognized by the fit soon passing away—for it is only a spasm. It soon, however, returns.

During the spasm, the pulse is much quickened, but not oppressed. On the contrary, it is contracted, and often hardly perceptible, though perhaps there may not be more than fifty beats in the minute. During the remission of the spasm, the pulse is strong. The mouth continues moist, and the mucous membrane of the eye is not affected. During the attack, the horse will sometimes pass hard, angular dung-pellets. This peculiarity of hardness and shape is due to the spasmodic contractions of portions of the guts.

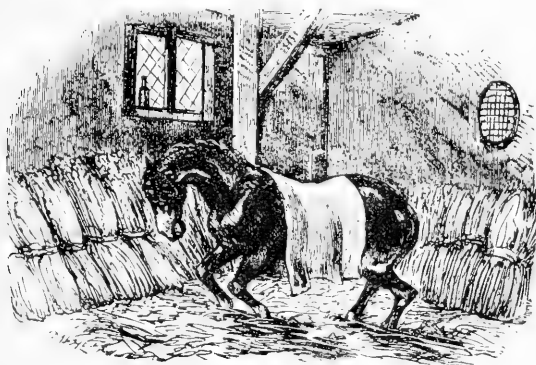
The belly is tense, and sometimes perceptibly swollen, and very tender on pressure. In some cases, it is much distended by the generation of gases arising from undigested or improper food. This peculiar condition is known as flatulent colic.

From pain and knocking about, the patient generally sweats much, but dries as soon as the spasm has passed

away. From the violence with which the horse knocks about, there is some liability to rupture of the diaphragm, especially in the flatulent attack.

If the disease is not soon relieved, the pulse will become very frequent and contracted to a thread. After about six hours, there is ground for apprehension. In protracted cases, the result is doubtful.

Favorable indications are given by an increase in the intervals of time between the attacks, and by each attack becoming slighter. Again, if the patient passes wind



Spasmodic Colic, severe.

freely, and soft dung, it is a favorable sign. The increase or decrease of the attack is also indicated by the increasing or decreasing tenseness of the belly.

In pure colic, it is especially to be remarked that the extremities continue warm and the skin remains in its usual state. The symptoms are only those of great spasmodic pain. There is no inflammation present, nor any sign of it.

II. Distinction between Colic and Inflammation of the Intestines.—Colic is at once distinguished from inflammation of the intestines by the attack being

sudden, without any previous inflammatory symptoms, by the pain being intermittent, and by the extremities being warm. The pain is also far more severe than in enteritis. During the intermissions of pain, the pulse in colic is strong, whilst in enteritis it continues throughout quick and small.

III. Treatment of Colic.—Friction of the belly will give relief, both by increasing the vermicular motion of the intestines, which is temporarily arrested by spasm, and also by drawing the blood from the interior to the surface. The legs should be well rubbed and wrapped in flannel bandages, and the heat of the body generally must be maintained by warm clothing. An embrocation of turpentine may also be rubbed on the abdomen.

Clysters of warm water mixed with a little oil or soap, to which, in protracted cases, one or two ounces of spirits of turpentine may be added, are very useful in loosening and moving the fæces and causing their evacuation. Nor is the effect of the clyster confined to the lower guts, into which the water is injected. By means of the warm water injected into the large, or lower guts, the small intestines may perhaps be excited to action, and if so, relief will soon follow.

If relief is not given by the clysters in twenty minutes, administer a diffusible stimulant in combination with opening medicine, unless the animal is already purged. Nothing answers better than an ounce of nitric ether with four drams of aloes, in solution. Another good formula is a pint of linseed-oil and an ounce of nitric or sulphuric ether. In such combinations, the stimulant rouses the bowels to increased action, and thus aids nature in overcoming the spasmodic affection; whilst the purgative clears away the irritant, which in so many cases is the original cause of the attack.

If in half an hour after the administration of the medicine the patient is not better, the stimulant may be repeated, and a full dose of castor-oil (eight to twelve ounces) must be given.

The rubbing of the belly must be continued throughout, and if the animal is in great pain, some walking exercise, given at intervals of half an hour, will often alleviate the spasms and expedite the action of the medicine. At the end of an hour and half or two hours, if the spasmodic attacks still continue, hot fomentations, by means of a rug steeped in hot water and held to the belly by a man on each side, must be applied. To obviate the liability to chill, when the fomentation is discontinued, the belly should be rubbed with ammonia liniment.

Throughout the attack, every possible means should be taken, by the assistance of three or more men, to prevent the patient from throwing himself down, as rupture of the diaphragm or entanglement of the intestines may result from any such violence. But if the animal prefers to lie down, and can be persuaded to keep himself or can by any moderate restraint be kept in this position, it is as good as any other. During the process of recovery, when the pains become less severe, we generally find the patient inclined to lie down.

In the absence of diffusible stimulants, such as nitric ether, any kind of spirits, such as gin, rum, or whisky, or aromatics, such as pepper and ginger, may be substituted. These all possess anti-spasmodic properties, and may be found in every house.

Perseverance in these remedies will almost always be found sufficient to bring about subsidence of the attack, although the case may be prolonged for some hours.

IV. Inflammation of the Intestines.—This disease may begin in the serous or outer membrane of the intestines,

in which case it is known as peritonitis; or it may have its origin in the muscular and mucous coats, when it takes the name of enteritis.

Inflammation may also exist in and be confined to the mucous membrane or internal lining of the intestines, producing the disease known as dysentery. The disease, though common in man, is very rare in the horse. It is totally distinct in its origin and nature from peritonitis and enteritis, and is easily known by the excessive purging which accompanies it.

(a.) *Symptoms.*—Unlike colic, which comes on suddenly, peritonitis and enteritis are much alike, and usually preceded by dullness, want of appetite, and feverishness. The inflammatory attack may commence either in the bowels or in the stomach, but as a general rule it begins in the bowels, and usually in the small intestines.

The early symptoms are the same as those of colic, but with this marked distinction, which at once shows the disease, namely, the absence of any intervals of ease. The pain, though in general less violent, is continuous throughout, and the pulse, from first to last, is accelerated to a high degree, to double or perhaps treble its usual number.

The further symptoms are those usual in inflammatory attacks, namely, cold extremities, mouth dry and either unnaturally hot or cold, the respiration hurried and oppressed, nostrils unduly dilated, the countenance painfully anxious, the body sometimes bathed in sweat and then cold, or with occasional tremors, and the tail erect and quivering. As in colic, the horse looks anxiously round to his flanks. As the disease progresses, the pulse sinks, and the legs and ears feel death-like cold. The mouth feels chilly.

(b.) *Treatment.*—In the preliminary, or very early stage, if the pulse is full and hard—not weak, nor above eighty

beats in the minute—it is advisable at once to have recourse to bleeding. Blood may be drawn until an alteration is effected in the character of the pulse.

If, notwithstanding the bleeding, the pulse continues full and hard, tincture of aconite in doses of from five to ten drops may be given, and repeated every hour until relief is gained. If the pain is great, an ounce of tincture of opium may be administered.

As long as the pulse is hard and full, stimulants will be injurious; but at a later period, when prostration supervenes, as it usually does, and the pulse becomes small and quick, they will be needed.

If, on the other hand, the pulse, even in the preliminary or early stage, is small and wiry (and such is generally the case), if the extremities are cold, and if there is great prostration, blood-letting will certainly be injurious. These symptoms in no way indicate bleeding. In such cases, there is probably a passive state of congestion of blood in the capillaries and smaller blood-vessels of the intestines, and the blood is therefore, in a certain sense, out of circulation. Bleeding will affect the quantity of blood, already too small, in circulation; but it will not in any appreciable degree affect the blood, congested and almost stagnant, in the intestines. It will, however, deprive the healthy organs of the blood required for their nourishment and support during the prostration occasioned by the disease. Bleeding in such cases is generally followed by rapid sinking and death. Stimulants are the appropriate treatment for these symptoms.

Having regard to the fact that the disease in the great majority of cases arises from indigestion, we strongly recommend its further treatment in all cases by a full dose of opening medicine. When the cause, which is generally a mass of undigested food, is removed, the intestines may

perhaps regain their healthy condition. Twelve ounces of linseed-oil will answer best. Aloes, even in solution, should be avoided in this disease. Except when the pulse (even after bleeding) continues hard and full, it is advisable to combine with the opening medicine an ounce of nitric ether.

As in colic, it is advisable to assist the action of the medicine and the removal of the fæces by the frequent injection of small quantities of warm water. Again, in all cases, both with a view of exciting external or counter-irritation, and also for the purpose of alleviating the pain, it is most essential to apply hot rugs steeped in boiling water to the abdomen. For similar reasons, it will be advisable, at intervals, to apply mustard freely over the same region. When the fomentation is discontinued, it is necessary to rub the belly with ammonia liniment, in order to prevent a sense of cold.

If, notwithstanding the opening medicine, injections, and hot rugs, no relief has been obtained, and the prostration and pain continue great, it will be necessary to administer, every three hours, a ball consisting of half a dram of calomel, half a dram of opium, and two ounces of carbonate of ammonia.

Exercise, though it was recommended in colic as a means of relieving the spasmodic pains, is not advisable in inflammation of the intestines.

PART XII.

DISEASES OF THE KIDNEYS, BLADDER, AND LIVER.

I. Inflammation of the Kidneys, or Nephritis.—

The horse is feverish, restless, and uneasy, and perspires freely. He often lies down cautiously and rises up again, as if suffering from colic; but the abdomen, instead of being hard and distended, as in that disease, is tucked up. He moves with caution, and experiences temporary relief from lying down, but is not relieved by hand-rubbing. He is unwilling to move; he stands with his legs wide apart, crouches and straddles in his gait, and groans if turned sharply round. Tenderness and wincing are evinced on the application of pressure to the loins. At frequent intervals, he stretches himself cautiously, as if about to stale, but passes no urine, or only a small quantity, highly colored and often tinged with blood. In very acute attacks, the horse will sit on his haunches, groan, and look round to his flanks. The bowels are usually constipated, and the pulse is accelerated, and soon becomes very quick and weak.

Inflammation of the kidneys is distinguished from a similar affection of the bladder by the secretion being very small and emitted with much groaning and effort, whilst in the latter disease the urine is secreted freely, and ejected almost as soon as secreted. In both diseases, the bladder is empty.

(a.) *Treatment.*—The depressing and destructive influence of the arrested urinary secretions must be diminished

as much as possible by exciting the activity of the skin and bowels. Flannel cloths steeped in very warm water should be at once applied to the loins. A pint of linseed-oil with a scruple of calomel may be given. After forty-eight hours, the dose of oil may be repeated, if needed in order to produce moderate purgation; but it is not probable that it will be required. When the purgation has ceased, the calomel may be advantageously repeated in half-dram doses, with one dram of opium, in a ball, night and morning for three or four successive days.

If the pain and straining are great, belladonna in doses of one dram, or combined with opium, or opium alone, may be given twice a day for a period not exceeding two days.

The skin should be stimulated by warm clothing and hand-rubbing. Woolen cloths wrung out of very hot water, and covered with a dry rug to delay evaporation, may be applied to the loins. Care must be taken to avoid the occurrence of a chill when the cloths are removed. With this view, the parts may be rubbed with an embrocation made of six ounces of oil, one ounce of the strongest water of ammonia, and two ounces of tincture of opium.

Mucilaginous drinks, such as linseed-tea, hay-tea, etc., should be given; but if the animal will not take them, he should be supplied with slightly tepid water, mildly acidulated by some mineral acid. Food, which must be sparingly given, should consist of grass or carrots. Clysters of warm water are useful, both in relieving the bowels and in acting as fomentations to the inflamed organ.

As soon as the congestion is relieved by these measures, the kidneys will again begin to resume their secreting functions. The urine, however, at first secreted is always very acrid, and therefore causes great irritation in the organ. In order to diminish this effect, every endeavor

must be made throughout the attack to get the horse to take mucilaginous drinks, or even water. Half an ounce of bicarbonate of soda given two or three times a day in the drink will act very beneficially at this period in lessening the acidity of the urine. If there is much pain, a dram of powdered opium with half a dram of camphor may be given in a ball.

II. Irritation of the Bladder.—Irritation of the bladder is indicated by restlessness, frequent straining, protruded penis, and by the passing at short intervals of small quantities of urine. If the symptoms are more grave than the above, it is probable that the disease has passed from the stage of irritation into that of inflammation of the organ. The bladder, on examination through the anus, will be found either shriveled up and empty or hot and tender.

(a.) *Treatment.*—To relieve the symptoms, many of which depend on the acidity and scantiness of the urine, the patient should be encouraged to drink plenty of water and mucilaginous fluids. The food should consist of mash and hay, with but very little grain. Grass and carrots and lucern are very beneficial; but clover and other plants of the trifolium variety are, for reasons already given, objectionable.

Rest is indispensable. Some laxative medicine, such as a pint of linseed-oil, is useful in unloading the bowels. Warm rugs should be placed over the loins, and clysters may be freely thrown up. The warm water will exercise a soothing influence on the irritated membrane. The effect, if need be, may be increased by adding to each clyster an ounce of laudanum or a dram of extract of belladonna. If the animal is debilitated, and especially if the irritation appears to proceed from weakness of the bladder, vegetable tonics may be given with benefit.

III. Inflammation of the Bladder, or Cystitis.—

Inflammation of the bladder is indicated by the same symptoms as irritation of that organ, but they appear in an aggravated degree. There is restlessness, with arching of the back, whisking of the tail, frequent straining, and a protruded penis. At short intervals, a few drops of urine, which is generally thick, high-colored, and mixed with ropy mucus and pus, will be passed with difficulty. In some instances, blood may even be voided. In protracted cases, the skin of the neighboring parts becomes scalded by the continued dribbling of the urine. Occasionally the animal lies down, as if suffering from colic. If the hand be introduced into the rectum, the bladder will be found shriveled up and empty, and oftentimes hot and tender; and upon the application of pressure to it, the patient will wince and strain violently. During the voiding of the urine, some few dung-pellets may be passed. The skin is hot and dry, and the animal often looks at his flanks.

If the disease is not relieved, the walls of the bladder will lose their contractile power; and in such cases the bladder may be found full, but this would only occur in the last stage. The bladder may be ruptured through over-distension.

The condition of the bladder should be ascertained at an early stage of the disease. If much distended, gentle manipulation and pressure per rectum will evacuate it, if there be no obstruction from calculus, or unless the neck of the cyst is inflamed or spasmodically contracted. If the disease be due to the presence of calculi, nothing but an operation, promptly performed, can give relief.

IV. Inflammation of the Neck of the Bladder.—

Inflammation of the neck is more common than inflammation of the body of the bladder. Its prominent symptom is retention of the urine on account of the inflamed condition of

the orifice through which it ought to pass. Though the neck is principally concerned, yet the inflammation affects more or less the remainder of the organ.

The treatment of the inflammatory attack is much the same as has been detailed above in reference to nephritis; but in addition to such treatment, it will probably be necessary to relieve the retention of the urine by other means. Those means, and also the chief signs of retention of the urine, will be detailed in the succeeding paragraphs.

V. Retention of the Urine.—In the majority of colic cases, the patient suffers temporarily from retention of the urine, owing to spasm of the neck of the bladder; but, otherwise, the disease is not common in the horse.

It may, however, arise from inflammation of the neck of the bladder, or from calculi in some of the urinary passages, or from want of tone, or from the bladder becoming over-distended with urine, as may sometimes happen when horses are driven a long distance without stopping, or in the case of animals who will not stale out of their own stables. Retention may also take place in peritonitis, on account of the pain it gives the animal to use the abdominal muscles in expelling the urine, and also in tetanus. In some cases, especially in prolonged diseases, retention is caused by an accumulation of débris and dirt about the orifice of the urethra.

(a.) *Symptoms.*—The symptoms of retention of the urine are great uneasiness, distress and anxiety of countenance, colicky pains, and straining. The pulse is not at first much affected; but if relief is not soon obtained, it becomes quick and hard, and ultimately imperceptible. The patient will frequently stand stretched out as in the act of straining to void urine. He will lie down and rise frequently. Clammy sweats will break out over him. In the

last stage, the pulse will entirely sink, and the animal may have a little ease before dissolution takes place.

In the early stage, any doubt as to the nature of the affection may be removed by putting the hand up the rectum and feeling the bladder.

(b.) *Treatment.*—The making up of the bedding and shaking about fresh straw often creates a desire and attempt to pass urine, and the effort may be successful. The steady pressure of the hand passed through the anus on the fundus of the bladder will often cause the urine to be discharged. Clysters will often assist in producing this effect. Hand-rubbing of the belly is also beneficial. In those cases which arise from an accumulation of dirt and débris about the orifice of the urethra, a thorough washing will often be found sufficient.

If these means are not successful in producing evacuation of the contents of the bladder, a catheter must be used, or the animal may die from irritation, or the bladder may burst. In a mare, the catheter is easily passed, but in the horse the operation requires care and dexterity. The penis will usually be found retracted. The hand, being well oiled, must first be passed up the sheath, and the penis must be grasped and gradually brought forward, and held by an assistant. A flexible catheter, well oiled, should then be introduced and gradually pushed forward, and when its point reaches the perineum, it should be worked with continued gentle pressure, so as to guide it upward.

If an obstruction such as a calculus exists, it must, if possible, be removed by gentle manipulation. An endeavor may be made to direct it into the urethra and to guide it forward. If very small, it may perhaps be expelled by the force of the urine, or it may be gradually manipulated forward, and then possibly extracted by a small forceps from the point of the penis. If, however, it is of any size,

it will not pass the curvature of the urethra, and then can only be removed by an operation. Hydrochloric acid, given twice a day in doses of two drams in a pint of water, will, in some cases, where the calculus is small or in small fragments, or where no urgent symptoms are present, be successful in dissolving the concretion.

(c.) *After-treatment.*—In all the above cases, the after-treatment consists in careful avoidance of the causes which may have induced the attack, in good nursing, spare diet, and the administration of tonics. Especial care must be taken that the animal be not subjected, for some time, at least, to exposure or overhard work.

VI. Bloody Urine.—Bloody urine may arise from inflammation of the mucous lining of the kidneys, ureters, bladder, or urethral canal, or from sympathy with inflammation arising from sprain of the muscles in the neighborhood of the kidneys. It may also be due to an escape of the coloring-matter of the blood, without any inflammation being present.

The treatment in such cases is rest and laxative diet, especially grass. Linseed-tea should also be given.

More rarely, this disease arises from weakness of the urinary organs, and must then be treated by the administration of tonics. Half a dram each of nitric and muriatic acid, with two ounces of gentian, or half a pint of the infusion daily, will answer exceedingly well. Some veterinarians prefer to give diluted sulphuric acid, in doses of half a dram, three times a day.

Bloody urine is a somewhat uncommon disease in the horse. Covering stallions, however, sometimes suffer from it, probably on account of the amount of stimulants often given them by their care-takers. In hot countries, bloody urine is very common among horses in high condition. A simple laxative will, in such cases, invariably effect a cure.

VII. Diuresis, or Excessive Staling.—For the sake of convenience, we have grouped this affection along with diseases of the kidneys and bladder, but in diuresis the urinary apparatus is not in reality diseased; there is only excessive function of the organs, due to derangement of the digestive functions or to an abnormal condition of the blood.

Diuresis, or excessive staling of very clear urine, produces great prostration of strength, and may, if neglected, end fatally. More often, however, if not relieved, it brings on such a deteriorated state of the system that glanders supervenes and carries off the patient.

(a.) *Symptoms.*—The principal symptom, other than excessive staling, is extreme thirst. The horse drinks readily and greedily, and if he be not indulged, will refuse his food. The skin is dry, and the coat is rough and staling. The digestion is generally out of order, and the bowels are torpid. The appetite is capricious, depraved, and impaired. From the prostration induced, the horse sweats easily and is incapable of much exertion, and falls away rapidly in condition.

(b.) *Causes.*—The causes of this disease are various. Most frequently they are connected with the use of bad forage. Mow-burnt or moldy hay and kiln-dried oats are especially apt to produce it, by reason of their diuretic effect on the kidneys. The water in particular localities sometimes also affects these organs.

Diuresis must not be confounded with the simple augmentation in the amount of urine, which may arise from a multitude of causes, some of them alimentary and others of a nervous character. Such augmentation, when only temporary, must not be viewed in the light of disease. Change in the food, for instance, often affects the secretion. Thus, if a horse be given tares, the urine will not only be

increased, but it will become whitish and show a great deal of sediment.

(c.) *Treatment*.—The treatment must necessarily vary, according to the cause from which the disease proceeds in each particular instance.

If the forage is in fault, it will probably be sufficient to change it. In all cases, however, a change of food is beneficial. Grass, whenever it can be procured, should be given.

If, in addition to the causes described above, the organs of digestion, as is frequently the case, are also out of order, laxative diet, with linseed-tea in lieu of water, and a slight dose of linseed-oil, will be useful. If the animal will not take linseed-tea freely, he must be allowed water. If the water which he has been drinking is hard, it should be exposed to the sun and air for a considerable period, or boiled.

Iodide of potassium and iodine have a very marked and beneficial effect in this disease. Of the former, one dram, or of the latter half a dram, may be given daily. Iodide of iron, in doses of one dram daily, also answers well. Lastly, if the horse has been dosed with condition-balls, they must be discontinued.

As great prostration accompanies this disease, a liberal diet should be allowed. In addition to good sweet oats, in summer sweet grass, and in winter carrots, sliced lengthwise, should be allowed; also bran-mashes occasionally. If the disease continues for a length of time, the patient will lose condition, and in such cases vegetable and mineral tonics will be needed.

PART XIII.

RELATING TO THE LIVER.

I. Situation and Functions of the Liver.—The liver is the largest gland in the body. The greater part of it is situated within the short ribs on the right side. A small portion lies on the left side, and also in the epigastrium. The outer covering of the liver is derived from the peritoneum, within which is a cellulo-vascular lining called the capsule of Glisson.

The chief function of the liver is the secretion of bile, a yellow, alkaline, soapy fluid. From the liver the bile passes directly into the intestines. The horse is not furnished, as are many other animals, with a gall-bladder.

Unlike most secretions, bile is elaborated chiefly from the venous blood; mixing with the partially digested food, it hastens its solution, and adapts it for absorption into the system. By some it is thought also to stimulate the intestinal linings to increased secretion of their special solvent fluids. The bile poured into the intestines is nearly all taken up again by the absorbents before the fæces (excrement) arrive at the anus.

The secretion of the liver is increased by rich, abundant food; by indolence; by heated stables; also by mercury, any preparation of ammonia, mineral acids, and by purgatives generally. Conversely, it is diminished by light diet, strong exercise in the open air, cool stables, compounds of iodine administered internally, and by carbonate of soda given while the process of digestion is going on.

II. Diseases of the Liver.—The liver, though subject to frequent derangement in man, and also in some of the lower animals, is comparatively seldom diseased, functionally or organically, in the horse.

Its diseases may be divided into two classes, namely, temporary functional derangements, such as inactivity, congestion, and inflammation, and, secondly, organic structural changes, such as enlargement, atrophy, softening, and induration. The first named ordinarily result from preventable causes, such as excess of food, want of proper exercise, or exposure to vicissitudes of temperature or weather. The latter are seldom primary affections, but, as a general rule, result from other diseases, such as influenza, inflammation of the lungs and pleura, etc.

(a.) *Causes of Temporary Functional Derangements.*—Inactivity, often followed by congestion, is frequently caused by excess of food, especially if it be of a stimulating character, combined with insufficient exercise. The liver becomes loaded with bile, and this condition is afterward succeeded by a diminution of the quantity of this secretion formed in the hepatic cells. This is in conformity with the usual rule of nature, that when any organ is put to excessive use for a time reaction follows. The horse then becomes hide-bound and debilitated. In many cases, the appetite falls off, but in others the patient may feed even ravenously. He will not, however, thrive until the organ is again stimulated to proper action. Congestion may also be brought on by a sudden chill or exposure.

A state of passive congestion may exist for a length of time without any very noticeable symptoms. On the other hand, inflammation may supervene on the congestion, whether arising from previous inactivity, or from chill, or exposure. In very acute cases, the period of congestion may be so short as to escape notice.

(b.) *Symptoms of Slight Derangements.*—Slight derangement of the liver is often indicated by irregularity of the appetite. The animal feeds well one day and will not feed the next. The skin is rough, dry, harsh, and itchy, and the mucous membranes are yellowish in color, owing to retention in the blood of the material which should have been formed into bile, or from re-absorption of the bile, due to some obstruction in its proper channel.

(c.) *Treatment.*—A little saline medicine, or some slight purgative, followed by more careful feeding and proper exercise, or half a dram of calomel with a little ginger every day for three or four days, will generally effect a cure. The derangement is often spontaneously relieved by a slight attack of diarrhea.

III. Congestion of the Liver.—If the slight symptoms indicated above are neglected, and the derangement is allowed to continue for a length of time, or in other cases without any such premonitory symptoms, congestion (often followed by inflammation) may take place in the organ.

The attack, however, generally comes on gradually. The animal is dull and indisposed to move; the appetite fails, and the bowels become disordered; the eye and mucous membranes assume a more decidedly yellowish tint, and the fæces are hard, scanty, light-colored, and fetid. Great uneasiness is evinced on the application of pressure to the right hypochondriac region. The breathing, in general, is not much affected, but there are frequent fits of blowing, and there is also a hollow cough. The pulse is full, soft, and compressible. The tenderness arising from a diseased state of the liver often causes the animal to favor his right fore-leg in action.

(a.) *Treatment.*—In congestion of the liver, the bowels must be acted on from time to time, according to the

strength of the patient, by purgatives; and such agents should be used as will, in addition, specially affect the liver, and cause an increased flow of bile. With this view, saline purgatives, such as four ounces of Epsom salts, may be administered once or twice a day; or calomel may be given in doses of thirty grains, with two drams of extract of gentian, daily, until the congestion is relieved. Mustard rubbed occasionally over the region of the liver has often a marked effect in relieving the congestion. The diet should be sparing in quantity, easy of digestion, and somewhat laxative.

In the later stages, when the strength begins to fail, tonics may be given. None answer better than half a dram each of nitric and hydrochloric acid in half a pint of water, with two ounces of gentian, or half a pint of the infusion.

IV. Inflammation of the Liver, or Acute Hepatitis.—If the congestion runs into inflammation, the pulse will become hard, quick, and small. The pain is not great, because the parts are soft and capable of swelling.

If the attack is not checked, the *faeces* usually become clay-like in color and consistency. The dryness, itchiness, and yellow tint of the skin increase, and the unhealthy, rough, and staring appearance of the coat is more marked. The glands about the throat and other parts of the body sometimes become enlarged. The animal rapidly loses condition. Occasionally severe diarrhea supervenes and complicates the symptoms. Ascites, or dropsy of the belly, is a common sequel of the attack.

The liver is also occasionally, though but rarely, subject to sudden acute attacks of inflammation. This disease is known as acute hepatitis.

The horse becomes dull and moping, and probably coughs occasionally. He hangs his head, his eye droops,

and he loathes his food. He seems to suffer from inward pain, but not of a severe kind. He has not lain down during the previous night, the dung-balls are small and dark-colored, urine is scanty, the mouth is hot, and the animal is feverish. The fever runs on, and the inner side of the lips, cheeks, tongue, and the mucous membranes of the nose and eyes are tinged with a yellow color. If blood be abstracted, the serum will be of a golden hue. The dung-balls are tinged, or perhaps deeply stained, with bile, and often encased in viscid mucous matter. The urine is of a yellow color, with a copious sediment. The patient lies down occasionally, looks at his side, and rises again. If the right side be pressed upon, he will flinch, or perhaps bite, and show signs of tenderness.

The pulse becomes quick, strong, and bounding, the breathing is disturbed and short. The patient appears dull and stupid, and often sinks into a lethargic state, or he may stagger in his walk.

In either of these attacks, if the symptoms are not soon relieved, the case may end in rupture of the liver.

(a.) *Treatment*.—Both in inflammation of the liver and in the cognate affection, acute hepatitis, no time must be lost in attacking the disease. Recourse may possibly be had to blood-letting, lest the liver should rupture. The effect of the bleeding may require to be supplemented by the administration of medicinal sedatives. Blisters should be applied over the right hypochondriac region, on either side of the abdomen, beneath cartilages of false ribs. The diet should consist of grass, carrots, bran-mashes, etc.

As soon as the more acute symptoms are abated, iodide of potassium may be given in one dram doses daily, combined with gentian and ginger. The effect of this medicine is to diminish the action of the liver. During the acute attack, calomel should *not* be administered, because it

is an excitant to the glandular structures. In the after or chronic stage, it is highly useful, and tends again to excite the organ to proper secretion.

V. Organic Diseases of the Liver.—Organic disease of the liver rarely occurs as a primary affection. It is usually a sequel of other diseases, especially of any disease which prevents the free circulation of the blood through it.

A state of hyperæmial congestion, or undue accumulation of blood in the capillary vessels, is the usual commencement of almost all structural disease. This congestion may arise from any affection which interferes with the passage of the blood into the pulmonary artery, such, for instance, as inflammation of the lungs and pleura, influenza, peritonitis, any violent visceral inflammation, valvular disease of the heart, or disease of the pericardium. Enlargement of the liver to a great size, and softening of its structure, often follows low typhoid affections. It is also common in old cold-blooded horses.

On the other hand, atrophy sometimes occurs, and the organ dwindles down to half its proper size.

In some cases, the liver takes on a scirrhus or indurated state, and ceases in a great measure to perform its functions.

Ordinary congestion of the liver, especially when it has become chronic, sometimes leads to enlargement and softening of the organ, known as hypertrophy of the liver. It is most often seen in very fat horses, such, for instance, as brewers' and millers', or in pampered animals, such as gentlemen's carriage-horses, which have not sufficient exercise. The liver slowly and gradually augments in size, sometimes with no sign of ill-health about the animal, until it suddenly bursts its capsule, and death soon follows.

The liver may also become the seat of tubercular and cancerous deposits. The bile-ducts may likewise be obstructed by calculi, when the same symptoms are evinced as in congestion and inflammation.

The existence of any such organic change, though its exact nature may not be discoverable during life, is indicated—but often only very obscurely—by the same symptoms as those previously described under the head of temporary functional derangements.

Accidents, such as a heavy fall on one side, may occasion rupture of the organ, when death will rapidly ensue.

(a.) *Treatment.*—In the early stage of organic disease of the liver, there is often great difficulty in diagnosing it. There is frequently only a passive state of congestion. If diagnosed, the treatment will be the same as that recommended for congestion. In extreme cases of hypertrophy, an external enlargement is not infrequently observed. Percussion may aid in forming a correct opinion. In many cases, however, the disease creeps on insensibly and without any well-marked symptoms to a very serious extent.

When any change of structure has taken place, complete restoration is not to be expected; but the further progress of the disease may often be checked for a length of time by keeping the bowels moderately open by means of saline laxatives, careful feeding, and exercise. The iodide of potassium and carbonate of soda are useful in reducing the excessive action of the organ. Tonics are also beneficial in assisting it to regain its tone.

PART XIV.

GENERAL DESCRIPTION OF CONDITIONS AND DISABILITIES.

Some Experiences of a Skilled Veterinarian.—

THE PRAIRIE FARMER has had for many years the editorial services of N. H. Paaren, M. D., and one of the most skilled and learned men in the profession of veterinary science in the United States. His writings are always correct, terse, and to the point. So valuable have been his services, that for years the United States Bureau of Animal Industry has had him in constant commission, not, however, to prevent his regular work on the journal in question. The editor of THE PRAIRIE FARMER, in examining his work, has felt that in no sense could he make this book more valuable than by incorporating within its pages some of his valuable contributions, from actual experience, in the care and disabilities of the horse, and also, from his practice, the treatment and cure of some sanable diseases that have, from time to time, come under his charge, through the descriptions from time to time sent by those who had suffering animals. Of course we shall confine the selections solely to those of the equine race. The editor is confident that these will prove one of the salient and most valuable portions of this volume.

I. Effects of Insufficient Shelter.—The following question was by Mr. D. L., Leavenworth, Kan.:

Please inform me if what is called insufficient shelter really has any very bad effect on horses. I mean work-horses and younger ones of that kind.

Answer.—Our heavy work-horse must be regarded as the product of artificial treatment. His capacious trunk and heavy body have been produced by an abundance of natural and artificial herbage. His digestive organs are large, and their functions powerful, possessing the property of quickly assimilating nourishment. This race generally has an excess of cellular tissue, and a soft temperament, with a tendency to fatten, and is incapable of enduring fatigue and privation like the smaller and more active breeds. Horses of a more active description more or less possess the characteristic temperament of the heavier races, and to be reared in perfection they must be supplied with an abundance of food, besides proper shelter and warmth, on which the body depends for its early development as food itself. The want of fulfilling these conditions is certain to incur loss from disease in almost every stage of their existence.

To commence with rearing—cases of mismanagement are frequent everywhere. It is not uncommon to see young colts indiscriminately mixed with brood-mares, horned cattle, and sometimes swine, in the barn-yards. Many of these places have little or no protection from the weather, and a want of anything like drainage is more common than otherwise. In fact, they are places far better adapted to the manufacturing of manure than the winter lodging of colts. The food, too, that is sometimes supplied to them in these places is of a very inferior character, being often the refuse of hay, etc., of the working-horses or the cattle. We have witnessed this picture many a time, and it is a wonder that more diseases and accidents do not occur than really do.

The functions most active in colts are those which administer to growth, such as the organs of digestion and assimilation; and hence derangement of the digestive organs is common to colts reared in this manner, as seen in the numerous cases of leanness, hide-bound, general or local dropsy, diarrhea, worms, lice, etc.; and in this spiritless state catarrh and other disorders of the respiratory organs are commonly produced, from the influence of cold and wet and insufficient nutriment. When you see colts that have undergone two or three winters of this short-

sighted system of management, having their skins rigid—sticking, as it were, to their ribs—the hair dull and dead-like, and the summer's keep failing to recover them, you may form a shrewd guess at what kind of horses they will make. Farmers who mismanage their young horses in the manner described, do so from a mistaken motive of economy. They imagine that the summer's keep will compensate for the partial starvation of winter. But the growing animal requires food, not only to sustain itself, but to maintain its growth.

The organic materials of a living body are constantly changing, portions of it becoming effete and taken away, whilst new parts are endowed with the property of life and are built up in their places. The living principle is permanent, whilst the material changes and the reparative process can not be maintained in its integrity unless the body be supplied with food adequate to its peculiar wants. This should contain a large supply of the phosphates, from which bone is formed, and of gluten or fibrine, by which the muscles are enlarged. These materials are obtained from oats and bran, natural and artificial grasses, and roots of various kinds. In the absence of materials of this kind, the bones do not increase in size, and the muscles are not sufficiently developed, and hence the common origin of so many ill-shaped, long-legged, light-carcassed horses, that are almost always sold at inferior prices, and frequently to persons who do not scruple to use them up quickly in work beyond their age and strength.

The immediate operation of wet and cold, arising from insufficient shelter, is no less injurious to older horses. The sudden transitions experienced between the existing state of labor by day, and when kept on grass during nights, often subjected to cold and wet, weaken the circulation of the surfaces of the body, and the blood, accumulating more in the internal parts, produces congestion, and hence inflammation of the mucous membranes of the air-passages, causing catarrhal complaints, such as coughs, sore throat, bronchitis, besides their common consequences, as chronic cough, thick-wind, and sometimes broken-wind.

The indirect operation of cold and moisture deserves a passing notice. Suppose a horse team, after a long jour-

ney or tiresome work, instead of being taken direct to the stable or under shelter, is left standing for some considerable time exposed to severe cold or wet. This is no very uncommon case. Internal congestions may occur from the chill suddenly arresting the perspiration and throwing the blood inwardly, oppressing some of the internal organs. But the chances are the horses will escape this danger, from the healthy reaction which follows the effect of cold, provided their vital energies have not been much exhausted by excessive labor and want of food. And yet, on their arrival home, to what may seem to be most comfortable quarters, they meet there with a greater enemy than either cold, or wet, or hunger—the heated stable; and the reaction which follows the exposure of the body in these instances frequently produces inflammation and the common result.

Farm stables are not only frequently heated to excess in consequence of the number of their inmates, but they are foul and vitiated from gases or vapors of a positively noxious quality, engendered from the decomposition of the litter, dung, and urine, together with animal exhalations. The deleterious operation of effluvia arising under these circumstances may be short of a directly poisonous effect, yet it gradually undermines the health, and can only be counteracted by a more efficient means of ventilation and general cleanliness. The distinction should be drawn between a hot stable and a foul one, as the former is capable of producing one series of effects and a foul one another. In the foul stable, we have heat and impurity, arising from the same source and operating in combination, producing not only inflammatory diseases, but others more serious.

It commonly happens that a variety of agents and circumstances may be required to act in combination to produce some diseases. Thus, horses that are badly fed and overworked by day are very likely to be exposed to heated, vitiated stables by night, and these are the common victims of such diseases as farcy, glanders, periodic ophthalmia (commonly called moon-blindness), etc. Farm stables with ceilings should have these not less than ten to twelve feet high. They should be well lighted, properly ventilated,

and be kept dry both from above and below, with the means of perfect cleanliness at all times. The average temperature should never exceed 62°, being 36° below blood-heat. The advantage of keeping the atmosphere of stables considerably cooler than the body itself, consists not only in the greater amount of oxygen contained in a given bulk of air, but also in the greater force with which the foul air of respiration is carried away from the breathing passages, and a pure air supplied in consequence of the difference of temperature maintaining a current. If, for any reason, more warmth is required, it should be supplied by warm clothing.

II. Consequences of Overworking Farm-Horses.—Subscriber, Galesburg, Ill., writes:

Does hard work of farm-horses injure them in any other way than that they can recover their wonted vigor and strength by occasional short periods of rest?

Answer.—The above inquiry covers an important subject for any farmer's consideration, for he frequently regards many of the losses he sustains as consequences of natural causes over which he has no control, and which no knowledge can avert. There can be no doubt that excess of labor forms a prolific source of disease in both young and old horses, and the vigorous health of young ones, in particular, is often wasted and destroyed from premature work, which, if economically managed for a year or two at most, might have preserved them in health and activity nearly to the full term of the allotted periods of their lives, instead of being dissipated in the first six or seven years of their existence.

The influence of work is clearly observed in the general condition of farm-horses, from the breaking-in to the termination of life, and much depends upon the amount of work given during the first two years whether they shall become healthy, useful animals, or unthrifty and weakly—a burden to themselves and to their owners. On well-managed farms, and where humanity and kindly treatment prevail, the working-horses live a monotonous kind of life. They are sufficiently fed and rarely overworked; and, except perhaps during the busy tillage season, or catching hay, or

harvest-time, their employment is easy—any disease seldom produced. It is not uncommon to see horses managed in this manner performing their daily labor at twenty years of age with apparent ease and comfort. The average work of a plow-team is eight to ten hours a day, and the pace rarely exceeds a mile and a half or two miles an hour. The severity of this labor will depend on the strength of the teams, their age and food, as well as the nature of the soil and cultivation.

It is mismanagement to make a pair of three-year-old horses perform the same amount of labor in the day as a pair of older horses that are stanch and accustomed to their work. If a pair of six-year-olds plow a given amount of land in a day, two-thirds of that amount is fully sufficient for a pair of young horses to do. It is also folly to expect a pair of horses fed in the open fields through the summer to perform their work freely through the autumnal wheat-sowing, or a pair that have been wintered out on hay, with only an occasional allowance of oats or corn, to bustle through the busy spring tillage as they should. There is no economy in practices which compel horses to perform a greater labor than either their strength can bear or their rest recruit; and hence the reason why so many are used up long before they reach what may be fairly considered as their allotted term of life. This may be estimated at fifteen years; but a very considerable number die or are destroyed before they reach half this period.

When a horse is overworked, one of two things always happens; he will lose flesh and become weak, or his legs will fail and he will become lame. Loss of flesh implies loss of muscular tone and weakness, which renders the body susceptible to various diseases, arising from extra exertion, improper food, exposure to cold and wet without the stables or foul and heated atmosphere within. And here we have the common predisposing causes to catarrh, bronchitis, and distemper in young horses, and to chronic cough, diarrhea, and general or local dropsy in old ones; besides lameness of various kinds, arising from bursal enlargements of the joints, thickening of the ligaments, and bony enlargements, which either restrict the animals' usefulness, or render them irreparably lame and worthless.

It is impossible to particularize the cases of mismanagement that occur in which horses are overworked on a farm. Many of the diseases arising therefrom, particularly cases of lameness, are seldom sudden in their effect, but of slow growth; and, notwithstanding this, it is an almost every-day occurrence to hear men blame some particular event of yesterday which brought to a crisis the folly and mismanagement of months or years. Like the last feather on the camel's back, it bears the blame which belongs to the load that preceded it.

III. Necessity of Exercise for Horses.—Mr. E.

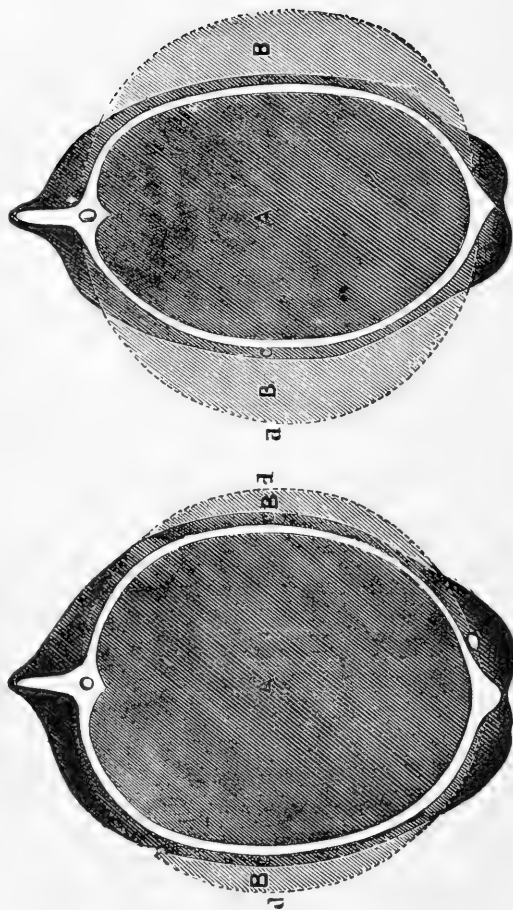
L. J., Davenport, Iowa, writes:

Will not Doctor Paaren give his views upon the question of exercise for horses?

Answer.—Exercise is requisite for the production of a good and substantial breed of horses. Without labor, as well for breeding-mares as for stallions, we can never grow stock for hard work. Too much inaction extinguishes the generative power. In this respect, wild horses show us an example worthy of imitation. And, besides, the powerful stallion has always an advantage over the weak one; for mares in a state of nature always give preference to the more active and vigorous, the indolent stallion, without energy, being refused and frequently ill-treated by them. In a herd of wild horses, the weakly can not keep pace in their laborious courses with the stronger, but are forced to stop for breath; the laggards-behind are dispersed and separated, and become the prey of ferocious beasts.

The domesticated horse has neither to fear the teeth of the wolf nor the inclemencies of seasons, and yet he is no longer the same animal. His whole nature has undergone notable modifications. Nowadays, man directs the intercourse of the sexes. Our present breed of domestic horses is, in truth, man's own, making allowance for the instinct of self-preservation, modified by domesticity. The horse no longer breeds but at our command. Since, then, man has made himself absolute master over horses, it is his duty to find means to make amends for the privileges he has deprived them of; and this compensation will be found in work. It is in well-regulated exercise alone that the do-

DIAGRAMS ILLUSTRATING CAPACITIES OF THE OPPOSITE FORMATIONS OF THORAX (CHEST).



The Thorax of a Blood-Horse.

(After Mayhew.)

The Thorax of a Cart-Horse.

A A. The capacities of the two chests in the quiet condition.

B B, B B. The limits of expansibility in each when excited.

c c, c c. The outside of the coat in the quiet condition.

d d, d d. The surface of the body in the excited state.

mesticated animal finds any guarantee for a long and supportable life.

The foal inherits direct reciprocity of qualities from its parents, but the attributes of the mare descend most directly, and have the longest duration; those which descend (with the most certainty) are a good constitution and endurance of work. Want of exercise, and too long standing in the stable, cause the blood to become morbid, and the muscles to lose their elasticity and energy. The horse in health, using his strength in the open air, and thus exhausting his powers, breathes with expanded lungs; every muscle, every fibre of his body, is on the stretch, ready ever for renewed efforts; so that it is not the muscles only that become augmented by well-regulated exercise, but the organs of respiration benefit by it. The lung of the working-horse presents a healthy aspect; it is voluminous, and plays its part with freedom; while, on the other hand, in the stallion, on whom too much indulgence has been bestowed, and too little activity, we find a lung shrunk and doughy, and without energy. In the growing colt which we deprive of exercise, we stifle the most promising qualities; and he, having them undeveloped in himself, in his turn robs all his posterity of them. Thus it is that we have, step by step, arrived at the deterioration of such excellent stock, the original of which exists no longer but in our imagination. Furthermore, we must take care not to breed from mares of dilapidated constitutions, worn out by work. Nothing is better for mares kept for breeding than the work they get out in the open fields. The intelligent farmer may, in this way, breed from mares up to their twentieth year. Not only can she work during gestation, but she does so both to her own and her offspring's welfare; and the success of the breeder will be the greater as he proportions the feed of the mare to her work. This, well ordered, it is that constitutes the whole mystery of breeding the domestic horse.

Our aim is to develop the utmost strength and celerity of which a horse is capable; and it is by well-regulated exercise that these two qualities are developed. Exercise produces suppleness in a horse, and strength and endurance under the severest trials and the most laborious work. Nothing is so contrary to the horse's nature,

destined as he is for exertion, as lengthened and continuous rest.

With a view of setting forth the indispensable necessity of exercise for horses, it will be as well to enumerate the inconveniences resulting from lack of it. Prolonged repose in the stable favors in the animal the plastic process. His fibres become distended, the cellular tissues surcharged with fat, insomuch that the whole body grows weak in proportion as it grows bulky, and in a short time becomes a spongy mass, lacking altogether energy and vigor. In such a condition, the horse proves a burden to himself. The muscular system grows weak, not only in proportion to the relaxation of its fibre and to the softening of the whole body, but, in addition, as the surcharge of useless fat incommodes in particular the extensor muscles in their movements, which succumb under the weight of fat; and thus it is that we see horses overfed and underworked become short-steppers, foundered, etc.

The overfat horse not only becomes soon fatigued, but in going wears his legs out faster, and, above all, does mischief to his feet. Having an enormous weight to carry, the hoof spreads and undergoes various deformities, more or less remarkable, according to its nature; such deformities being always slow, frequently difficult of removal, and such as keep the horse for a greater or less time out of work. For want of exercise, the wind grows short, accumulation of fat in the cavity of the chest being opposed to a full expansion of the lungs. This likewise detracts from the speed of the horse, and from his power of enduring fatigue.

Excessive embonpoint, or plumpness, impedes the freedom of respiration, and tends to the formation within the body of carbon, and this accumulation, favored by a tardy respiration, becomes the occasion of renewed deposit of fat; and since, at the same time, the blood becomes thick, it is considered as the source in animals in general of many maladies. Inaction weakens the digestive functions. Horses that have too little exercise are more subject than others to colics and indigestions. The general circulation of liquids penetrating the tissues becoming more tardy, the consequence is a disproportion between

venous and arterial blood. The more sluggish respiration grows, the less arterial blood is made; and while the blood engorges the veins, it becomes surcharged with carbon, as is evinced by its deeper hue. Again, a slackened circulation becomes the occasion of dropsical swellings in the limbs, windgalls, etc., and these are observed to disappear in the ratio in which exercise is enforced. Inaction augments the sensibility of the skin. It becomes relaxed, and the animal, in consequence, is rendered more susceptible to external influences. Long sojourn in the stable notably affects the vision. The horse neglected to be exercised grows indocile, and especially so should he be young. Through idleness he contracts many bad habits in the stable; he rubs himself, crib-bites, kicks, etc.

All these inconveniences disappear under suitable and sufficient exercise. Exercise it is that determines the strength of the muscles, the assimilation and absorption of the juices. It has a tendency to enlarge the cavity of the chest, by rendering respiration more easy of performance, and it checks excess of fat, by favoring transpiration; making good the saying of the horseman, that exercise is as good as a dose of physic. In a word, exercise and labor constitute the best preparation for fecundity, at the same time that they insure health and longevity.

Notwithstanding that exercise exerts great and wholesome influence upon the horse, such advantage can not be insured except by providing that the exercise be judiciously apportioned to the strength of the horse; that it be of a kind suitable to his nature, and that every requisite attention be paid him after exercise.

IV. About Soundness.—It may be supposed that the hackneyed term "sound" is so explicit as to need no comment—and most people conceive it to be so; but the term "sound" really admits of as much contrariety of opinion as the word "tipsy;" one man considers another so if, at ten at night, he is not precisely as cool and collected as he was at one in the day. Another one calls a man so when he lies on the floor and holds himself on by the carpet. So, as to soundness, some persons can not see that a

horse is unsound unless he works his flanks like the drone of a bagpipe, or blows and roars like a blacksmith's bellows; while some are so fastidious as to consider a horse as next to valueless because he may have a corn that he never feels, or a thrush for which he is not, nor likely to be, one dollar the worse.

So far as relates to such hypercritical deciders on soundness, we venture to say that, if they brought a veterinarian many sound horses in succession, he would find something in all of those produced that would induce such persons to reject them, though, perhaps, not one among the lot has any defect of material consequence. To say the least, we will venture to assert that nine-tenths of the horses now in daily use are more or less unsound. We make no reservation as to the description of horse, his occupation, or what he may be worth. We scarcely ever had, indeed scarcely ever knew, a horse that had been used, and tried sufficiently to prove him a good one, that was in every particular unequivocally sound. We have no doubt that there are thousands of owners of horses who will at once say we are wrong in this assertion, and would be ready to produce their own horses as undeniable proofs whereby to back their opinions and refute ours. They may, perhaps, say that their horses are never lame—perhaps not; that is, not lame in their estimation or to their eye; but we daily see horses that go to a certain degree indubitably lame, while their owners conceive them to be as indubitably sound. These horses, perhaps, all do their work perfectly well, are held as sound by owners, servants, acquaintances, and casual observers; but a practical eye would detect an inequality in their going, as a watchmaker would do the same in the movement of a watch, though we might look for a week, or listen for the same length of time, without being able to either see or hear the variation. The

watch might, however, on the average, keep fair time, but it would not be a perfect one; and what matters, if it answers all the purposes for which we want it? A really bad watch, that can not keep time, is a different affair. It is pretty much the same with a horse; if the unsoundness is such as to render him unable to do his work, or even to do it unpleasantly to himself or owner, or if it is likely to bring him to this, our advice is to have nothing to do with him. If, however, this is not the case, or likely to be so, if you like him, buy him.

It is not improbable that a man may say, I begin to believe that few horses that have done work are quite sound, but a sound one I will have; I will, therefore, buy a four-year-old, that has never done a day's work. We will acknowledge that, if he does so, he may probably get his desideratum; but do not let him make too sure of this. There are such things as four-year-olds unsound, as well as worked. But, supposing him to have got this sound animal, what has he got? An animal that he has got to run the risk of making useful, so far as teaching him his business goes; and by the time this is effectually done, and the colt has arrived at a serviceable age, he will probably be quite as unsound as many of those he has rejected; independent of which, and supposing him to continue sound, the breeder of this horse must have better luck or better judgment in breeding than his neighbors, if more than one in five or six that he does breed turn out desirable horses in every respect. If he turns out but a middling sort of beast, it is but small satisfaction to know that he is sound; in fact, so little satisfaction should we feel that, if we were compelled to keep and use him, so far from rejoicing that he was sound, we should only regret that he was not dead.

In relation to the doings of dealers in horses, it is not our present object to expose the tricks of the trade, or to

prejudice the unsophisticated buyer against all horse-dealers. There are honest horse-dealers, and there are dishonest ones; and we are sorry to say that, in numbers, the latter predominate—that honesty in horse-dealing is not proverbial. But horse-dealers, like other mortals, are apt to err in judgment, and all their acts should not be set down as willful wrong-doings. However, be their acts what they may, the general verdict is against their motives. Therefore, supposing we could bring any person or number of persons to believe the fact that a man conversant with horses might sell as a sound horse one that might, on proper inspection, be returned as unsound, all that we could say or write would never convince the majority of persons that a dealer could innocently do the same thing. If his judgment errs, and leads him into error as to the soundness of his horse, it is set down, not as willful or corrupt perjury as to oath, but most undoubtedly as to his word and honesty.

V. Stumbling.—[The following is in reply to a request for a cure for stumbling.—EDITOR.]

The usual causes are infirmity, peculiar formation, gait, indolence, and bad roads. If a horse blunders from weakness or infirmity, a blow with a whip will not render the infirmity less. Keeping such a horse a little on his mettle will in many cases make him go safely to a certain extent—that is, it may, by preventing his dwelling long on either weak limb, also prevent it giving way under the weight imposed on it; but hitting him when it has so given way as to cause a stumble, can not recall the stumble, but will very probably increase its effects. If blundering arises from formation, no whipping, whensoever applied, can alter that; and if from formation the horse can not put his foot fairly or squarely on the ground, blunder he will and must; he can not help it; so, how can correction do any good in this case? When arising from gait, correction with the whip when he stumbles will not alter the gait; but the hands, when behind him or on his back, with the whip and spurs as aids, may, if properly used, when he is not in the act

of stumbling. Correcting the cause may do a great deal of good; but correcting, or rather punishing, the animal will not prevent or remedy the effect. Should the horse blunder from sheer indolence, correct the indolence as much as you please. If he will not be roused to energy, or, at all events, to quick motion, from one stroke of a whip, nor take notice of ordinary emphatic remarks, make use of stronger, together with more severe touches of the whip, and by thus making so lazy a brute move more quickly, make him move more safely. Why is this? If we make a lazy horse trot three miles in twelve or fifteen minutes, he must move his legs quickly. If a horse will walk right along cheerfully four miles and a half an hour, we generally find him as safe in a walk as in a trot. But so long as he is allowed to walk, all his energies cease also, and then he blunders again—and so he will do as long as he is a horse. Bad roads will make the fastest horse trip occasionally, perhaps frequently; and in such cases, riders or drivers are apt to do what renders the matter worse. They hold their horse tight in hand, the effect of which is, that it prevents all freedom to his action, and the making use of that instinct nature has endowed him with in picking his way with safety. It is a very common thing to see a horse blunder into a rut when his rider makes him cross it at an injudicious moment; but if a horse voluntarily crosses it, we would back him at a hundred to one that he does it safely. If, from there being no place where he can plant his foot surely down, the horse falters in doing it, what good can result from tugging at his mouth because the foothold is bad? If he has not sense enough to put his foot on safe ground, if there is any, holding his head tight will not put sense in it; and striking him for tripping on such occasions is worse still, for that will neither mend the roads nor give him instinct, though it may frighten what little he has out of him. There is yet another and very frequent cause for a horse tripping, blundering, or even falling—which is fatigue. In this case, striking him for doing what he can not avoid is absolute cruelty and injustice, and, as on all other occasions, done when he has tripped or blundered is perfectly useless. No doubt the whip and spur, plied when

he is not blundering, force the poor brute to increased action, and from that probably prevent his tripping as often as he might otherwise do; but to ride a willing, good horse till he requires this is most unjustifiable.

VI. Heredity and Disease.—The relation which heredity bears to disease must not be considered if the young animal is born with disease fully developed. As with most rules, so there are exceptions to this, and especially so with contagious diseases. Thus a glandered mare may throw a colt which at birth shows signs of veritable glanders. A sheep diseased with small-pox may bring forth lambs showing evidences of this disease on their skin. A child may be born with all the evidences of syphilis. In such cases, an intra-uterine infection has taken place, and such disease of the offspring is then termed congenital, or inborn. Now and then it happens that a calf is born, at the dissection of which, a few days thereafter, are found very distinct tubercular nodules in the pleura. But it is a rule with hereditary diseases that the offspring is born with only a tendency thereto; that is, the animal is born with those imperfect histological arrangements of tissues which incline it to a ready development of such inherent defect or diseases at any time when it should happen to become subjected to certain injurious influences likely to further such development.

As with a person descended from consumptive parents, who, as a rule, does not become consumptive before his twentieth or thirtieth year, so it is, for instance, with loup-ing-ill in sheep, which almost to a certainty does not develop in the offspring before the end of its second year of age; and with the offspring of tuberculosis cattle, in which the first symptoms of tuberculosis often do not develop before the second year, and often much later. Colts descended from parents afflicted with spavin, ringbone, or

windgall are not born with these ailments, but at most with a deficient cellular firmness and incapacity and resistance in the bones and synovial membranes, perhaps also a tendency to faulty development of the bones and joints in size, power, and conjunction. Spavin, ringbone, windgalls, etc., do not develop before the animal is used for work, or if the weakness or vulnerability of the structures are particularly great, it may happen even after wanton escapades on the pasture, stampedes, or forced exercise. Similar rules apply to other hereditary defects or diseases.

On the other hand, it must be remembered that the inherited tendency does not always or necessarily lead to the actual disease. A part of the tendency is always born with the young animal, even when only one of the parents had a transmittible defect or disease, or that to the development of the same conditionate tendency, and although the other parent may have given a substantial share to the segmentation nucleus sufficient to a certain degree to equalize the other. But if from this tendency the same disease or defect will appear, depends upon the conditions and influences under which the young animal develops.

A judicious quantitative and qualitative maintenance improves the histological arrangement and the power of resistance of the various tissues, and lessens the tendency thereto, while such diseases that may befall the animal during youth or before maturity, as well as insufficient food and faulty management, increase the defective state of the tissues, and also enhance the disposition to sink into the said hereditary ailments.

In some hereditary diseases, specific influences must necessarily become operative if the existing tendency to such ailments should materialize. This seems to be settled for certain as regards tuberculosis in man and in cattle, since Koch found a bacillus to be the genitor of this dis-

ease; and periodic ophthalmia (commonly called moon-blindness) is very likely due to something similar. It is not yet known if any similar specific disease-inducing cause is operative in the appearance of roaring, whistling, and other hereditary ailments. It is occasionally noticed that a sheep during all of its perhaps eight years of life remains entirely healthy, while the buck who is its sire was suffering from louping-ill. Such happenings have led many to believe that the disease is not so very hereditary, though herein they are certainly mistaken; for that very same sheep, after coupling with a perfectly healthy buck, is capable of bringing forth lambs which, at the end of their second year, or later, succumb to louping-ill. The occurrence is easily understood from what we have said above on this subject. The tendency to louping-ill was in the said sheep from its birth, but it remained dormant, and the disease did not develop, because the animal grew up and lived under favorable conditions. Contrary to this, the louping-ill developed in the lambs in the course of time, because they happened to grow up under less favorable conditions. Cases of this kind, to which the term of atavismus is applied, are not very rare.

The correctness of the above statement concerning dormant hereditary tendency is perhaps most impressively illustrated by that, in mankind, often observed transmission from the grandparents of an unnatural perforation of the male generative organ, in which the extremity of the urethra terminates on the under part of it, close to, or even between the testicles, the scrotum being imperfectly formed. A man afflicted with such deformity marries, and although his capacity for impregnation is very much diminished, he begets a daughter, who of course can not have the said deformity. This daughter marries a man with perfectly normal genital organs, and all his sons

begotten by this union are born with the grandfather's defect, hypospadias.

VII. Abnormal Conditions of the Skin.—The skin is one of the most important organs of secretion; but it is also very active as an organ of absorption, and disturbances of its functions are as reactive upon the whole body as internal diseases are upon the skin, through which latter the existence and extent of such diseases are distinctly manifested, and upon the healthy condition of which a favorable crisis is often determined or dependent. It is a sign of a general healthy condition of the body when the skin over the whole surface is soft, elastic, evenly and moderately warm, and slightly oily to the touch.

In all feverish diseases, the skin becomes hard, dry, and parchment-like, and, together with increased heat, this is especially the case in acute hectic fever, in putrid fever, and in nervous fever. The skin is cold, dry, and parchment-like during the chills of active fevers, and during which it may also here and there, in patches, become hot, and even wet. But when in the course of active, or sthenic, fever such skin becomes softer, generally warmer, more moist, or vaporous-like, these are indications of subsidence of the fever and of commencing recovery.

A greasy matter is secreted by the skin in so-called wet or ulcerating scab in sheep, in so-called red mange in dogs, and in scurfy eczema of the lips in sucking calves and lambs. The skin is dry, dusty, or scaly in the so-called mealy or branny tetter, or furfuraceous herpes, of horses and cattle. In cases of grease, so-called mallenders, scratches, and in tetter of the mane and tail of horses, the affected parts of the skin are in the beginning more or less pimply, or postulous and greasy; later, however, this condition changes somewhat, when the skin becomes more and more wrinkled, and only the crevices are moist and greasy.

In burns of the skin, vesicles or blisters appear on the affected surface, or there may be exudation of lymph, pus secretion, or the skin is found hard and solid like sole-leather, and insensible, and beneath this there may be going on a preparative action for its organic detachment, by the formation of pus, or pus may already be fully developed, and the crust found partly detached.

When the skin in the course of an active, or sthenic, fever is not uniformly soft, warm, and humid, the disease is then yet progressing; but continues the skin to be cold while it is wet and perspiration even dripping, then the fever has reached a dangerous degree. When it can be seen that the skin is uniformly dark-red and compact in its texture, it is an indication of increased action; while a pale, doughy texture of the skin indicates a decrease of action, or an asthenic condition. When the skin in the course of an active inflammation becomes a brownish-red, inflammation has reached its highest degree; but when it assumes a peculiar pale, leaden glance, it is evidence of the near approach of, or already existing, hot gangrene, or gangrene proper, with simultaneous atony of the cutaneous vessels, which local debility may very easily become general, and soon end the animal's existence. In quinsy, or malignant sore throat, in swine, the skin in places becomes of a nearly blue-red color.

It is also a sign of complete exhaustion, and of approach of dissolution as well as of mortification proper, when in the course of an asthenic disease the pale skin assumes the color of dry earth.

The skin assumes a yellow tint in cases of interrupted secretions of bile, biliary engorgement, disease of the portal vein or the biliary system, in jaundice, etc. A peculiar deep-red rose-color appears in erysipelas.

Of course, it must be understood that all of these different variations in the color of the skin can only be clearly distinguished on animals having a light skin, such as on white-born horses and on sheep and swine; but even on animals with a dusky skin, the mentioned variations in color may be more or less distinctly apparent through the dark-gray surface when the morbid conditions to which they are due exist in a higher degree.

VIII. Care of Animals Recovering from Disease.—After the subsidence of an active disease, the restoration to perfect health commonly proceeds with rapidity. The appetite being often excessive, and the assimilative powers proportionately active, in such cases, little care in the arrangement of the food is necessary, so that a liberal allowance of food be given. The ordinary food will be eaten with avidity and with benefit, so that the animal be not allowed to eat to repletion. In other instances, the patient advances slowly to the convalescent state, a fastidious appetite and impaired digestion retarding the recovery by preventing the animal eating, or at any rate appropriating, the material which the system really requires. In the meantime, the animal's taste may be consulted, and any tempting morsels offered; the admixture of condiments is sometimes the most ready method of provoking appetite and aiding digestion; salt, turmeric, anise-seed, and various spices are at times effective, combined with the ordinary diet.

One golden rule deserves unceasing repetition, viz., never to leave any food which the animal has refused in his sight or within his reach; and second only to this maxim is another, which insists on scrupulous cleanliness in the hand which touches the food and the vessel containing it. Let those who question the necessity for such delicacy observe how the horse and other animals test everything by

the sense of smell, and judge how important it is that the extreme sensitiveness of the sick subject should not be outraged by even an offensive odor.

When extreme debility is present, food must be selected with care, as the digestive function is easily disturbed. The diet for such cases is to be tolerably rich in starch and sugar, as deficiency of reparative material is often more serious than diminution of the muscular structure; hence the value of mixtures containing oil-cake, linseed, potatoes, etc. But no amount of nutriment is of the least use to the organism so long as there is a deficiency of fuel for the respiratory function. The development of the muscular system will follow as soon as the animal is sufficiently recovered to take exercise; for during the period of absolute inaction it is in vain we try to preserve the integrity of this structure, but no difficulty is found in keeping up the proper quantity of fatty texture while the patient is yet too prostrate to be exercised with safety.

A suppurating surface of any extent is usually associated with considerable debility, sometimes with dangerous and even fatal prostration; the healing process may proceed satisfactorily for a time, and suddenly be arrested for a time; a general languor affects the system, although the appetite may remain good. The proper dietetics in such instances will include not only nutritious, but stimulating food; thus, if the digestion remains active, ground oats, barley, and corn may be allowed, together with good hay, also any preparations containing condiments. The medical treatment at the same time will principally consist of tonics and cardiac stimulants; the object being to increase the energy of the circulatory and nervous systems, as well as to furnish abundant material for the reparative process.

Under extreme prostration, digestion is invariably suspended, consequently no advantage can possibly follow the introduction of food into the system at such a time, if we except aliment of the blandest and most soluble kind. The practice of giving a horse an extra allowance of oats, and probably corn, after an extra amount of work has produced absolute exhaustion, is, to say the least, extremely injudicious; the animal would be far better left entirely without, as an alternative, although, as we have stated, a bland and soluble diet, a well-cooked gruel, will be beneficial, and will answer all the purposes of a heavy meal.

IX. Perspiration—Evil Consequences of Its Suppression.—Many of the diseases of horses and cattle are caused by suppressed or checked perspiration; the various appearances they assume depending, perhaps, in a great measure, upon the suddenness with which the discharge is stopped, and the state of the animal at the time it takes place. Thus, if a horse, after being heated and made to sweat by exercise, and then suffered to stand still, be exposed to a cold wind or rain, a fever, or inflammation of some internal organ, will probably be the consequence; and the disease thus produced will be still more serious if the horse's exercise has been such as to produce considerable fatigue. If, on the other hand, a cold current of air be admitted to a horse's body as he stands in a stable, it will often cause a catarrh or cold. Cattle often suffer from being kept in cold, bleak situations, particularly in the early part of spring, during the prevalence of a northwesterly or northeasterly wind. In this case, the suppression of the perspiration is more gradual, and the diseases which result from it are slower in their progress, consequently more insidious in their nature; and it often happens that the animal is left in the same cold situation until the disease is incurable. It seems probable that in these cases the per-

spiraling vessels gradually lose their power, and that at length a total and permanent suppression of that necessary discharge takes place; hence arises consumption, decayed liver, mesenteric obstructions, and various other complaints. How necessary, therefore, it is to provide sheltered situations for the stock. How many diseases might not be prevented by such precaution, and how much might not be saved, not only in preserving the lives of the cattle, but in avoiding the expense, too often useless, of cattle-doctoring!

X. Transmission of Qualities.—J. H. P., Mount Pleasant, Iowa, writes:

I have confused ideas about what I see you referring to occasionally as to influence of parent on offspring, such as constitution, inbreeding, development, disease, and so on. Please explain these matters sufficiently for ordinary understanding.

That "like begets like" is a rule having very extensive sway; yet, as propagation is the work of two parents, the respective influence of the one or the other is a matter involving considerable diversity of opinion, and prevents anything like a certain conclusion being arrived at. In the breeding of the animals, if the object be to modify certain defects, by using a male or a female in which such defects may not exist, we can not produce this desired alteration, or, rather, it can not be equally produced in all the offspring, but can only be attained by weeding out those animals in which the objectionable points are repeated. Many breeders, finding their attempts at improvement frequently baffled, cling with superstitious tenacity to the doctrine of purity of blood, believing it to be the only course by which true safety is to be found.

Now, pure breeding, which when carried to excess is called in-and-in-breeding, has its advantages as well as its disadvantages. Its friends observe, with great force, that when we have in breeding reached great excellence, it is folly to risk the loss of such excellence by means of crossing; and the more so as the defects of a parent may disappear in a first or second and reappear in a third or fourth generation—"breeding back," as it is commonly

termed. Again, it is urged that excellencies can only be perpetuated by union with similar excellencies, and beyond all this that there is a certain amount of advantage from an unstained lineage—from the very possession of breed, as it is designated. The objectors to in-and-in-breeding urge that by so doing we engender weakness of constitution, diminution of size, hereditary diseases, and also a tendency to barrenness; but it is argued in reply to such objections that they occur from want of sufficient care in weeding out defective animals, whether as respects constitution or size. Unless the choice is extremely confined, most of the evils of pure breeding can be avoided by careful selection and vigorous weeding.

High breeding, or pure breeding, refers to very different desiderata in different breeds. In thoroughbred horses it signifies a very high development of the muscular and nervous systems, accompanied by such mechanical structure as, when united with it, constitutes the highest manifestations of speed and endurance. In the ox, however, it implies very different qualities, viz., early and rapid growth—the development of flesh or muscle on the parts most prized for food—a disposition to lay on fat; and these, with the possession of the smallest amount of bone consistent with strength and health, are the principal characteristics of a well-bred animal. Instead of the highly nervous temperament of the race-horse, we have here a quiet, lazy disposition—in fact, a lymphatic temperament, by the influence of which the digestive organs reign supreme, and convert, for the public benefit, a given quantity of food into the utmost of flesh and fat. The same observations apply with equal force to the sheep, and in a still stronger degree to the pig. A well-bred pig is the incarnation of everything indolent and lethargic, and the very antipodes of that high organization and nervous development which belongs to a high-bred horse.

Everyone conversant with animals knows that not only their natural, but many of their acquired, qualities are transmitted by the parents to their offspring. A hereditary tendency may be defined as a strong proneness in the constitution to assume the same characteristics that existed in one or both of the parents. It will be perceived that this

definition will comprise the mental as well as physical peculiarities—the excellencies as well as the defects in the constitution—as we take it for granted it is a conceded point that numerous satisfactory examples can be adduced of excellence and talent as well as weakness and vices, of the parents being transmitted to their offspring. Animals may be born free from disease, but with peculiar textures in certain localities, of such imperfect kind as to become morbidly affected by causes which would produce no effect whatever on limbs or textures soundly developed.

It is known by all physiologists that the body we possess to-day is an entirely different body from that which we possessed a few years ago, and that every atom of the structures of which this body is composed to-day will be totally and entirely changed in a few years hence—if we are still in existence. Decay and reproduction are processes constantly going on in every living body; it is nature's process, an inflexible condition of vitality going on throughout the entire constitution. The peculiarities of constitution continue to operate, in their own secret, silent, mysterious, but never-varying courses.

It is very questionable to our mind whether any known method of treatment can possibly prohibit the development or natural progress of any morbid condition in its legitimate locality; we are strongly impressed with the idea that it is a pre-existing germ, as certain as the oak is contained in the acorn. Nature's laws are wise; physical defects must assert themselves. Nature can fully accomplish her task, but she stops at the limit of her destination; the inalienable attribute was stamped upon the fœtus in the womb, and can not be changed by human invention.

We may define diseased conditions in this connection. Acute and chronic diseases, properly speaking, belong to a different type from those of a hereditary origin. Acute diseases are generally referable to extraneous and violent causes, and are of comparatively short duration; chronic diseases are generally referable to the continuance of causes inadequate in themselves to induce acute diseases; but hereditary diseases are referable to no apparent cause—they are a natural condition in the development of the animal.

XI. The Temperature of the Body.—The distribution of the bodily heat is very different in the various conditions of the living animal. In perfect health of the animal, the temperature of the skin is only a few degrees less than that of the blood. The temperature of the body can, of course, not be judged with any degree of certainty by the application of the hand to the surface; for the hand may happen to be either very cold or very warm. To a very cold hand the temperature of a sick animal might appear to be very high, while to a warm hand the same surface would appear to be the contrary. The ancients had no better means of estimating the temperature of bodies than that of observing the sensation of heat or of cold imparted to the hand.

The idea of the existing temperature, which was obtained by placing the hand in contact with the body or diseased part, depending solely on the acuteness of the observer's perception, could at least be only approximately correct, and must often have been wholly false. The sense of touch may be educated to a delicate appreciation of heat and cold, but it is always liable to error from various causes. For example, the skin of the animal examined may impart a sensation of considerable hotness, when the thermometer would reveal entire absence of fever; and, on the other hand, the skin may be cold to the touch during the existence of a more or less pronounced elevation of temperature. The clinical thermometer now takes the place of former methods of ascertaining the temperature of the interior of the body, or the blood-heat.

In cases of disease, it is often very important to correctly ascertain the temperature of the body. With regard to the external heat of the body, it is also essential to know if the same degree of heat prevails over the whole surface, or if some parts appear abnormally warm or cold. An

abnormal general increase of heat is an indication of fever, while increased heat of a limb or a circumscribed part of the body generally is a sign of congestion or inflammation of such part. When the general bodily heat is lowered, it is a sign of intercepted, suppressed, or enfeebled vital energy, and which may be either general or local. Coldness of the body, trembling and shivering, are, therefore, observed in the beginning of inflammatory fevers, because the free action of the capillary vessels of the surface of the body is interrupted. With the recurrence of free circulation, there is an increase of heat, and when this becomes general over the whole body it is a favorable sign, or a sign that the vital forces have conquered the morbid disturbances, when a beneficial crisis follows, which soon manifests itself by a general healthful and non-exhausting perspiration.

A dry heat, which causes the skin to become tense like parchment, is a sign of continued progress of a disease. This is also the case when heat appears unequally distributed over the body; for instance, when the inside of the mouth and the whole of the head are very hot and the limbs are cold. It is an unfavorable sign when perspiration breaks out while the body remains cold, or when perspiration appears at some parts of the body and not at others. By such perspiration the animal feels no relief, and the morbid degree of irritation is not lessened thereby; the vital strength appears unable to match the then pending struggle for life, and is even threatened to be overcome in the effort, or to be entirely destroyed in the struggle of the reaction. The appearance of a cold perspiration, as well as a general coldness over the whole surface of the body, during a paroxysm of fever, or during an acute inflammation, especially when also the exhaled air, which hitherto was warm, now becomes cold, is always an un

favorable sign—a sign of approaching mortification and death.

XII. Bad Effects of Overfeeding.—No horse ought to be overfed, or to have an unlimited allowance of highly or even considerably nutritious food. The packing of a horse with as much food as he can take, under the mistaken notion either of kindness to the animal or of its enabling him to perform a maximum of work, not only wastes the food and does the horse no real good, but injures the constitution and predisposes him to many dangerous inflammatory diseases. His stomach, when unduly full, presses upon the diaphragm, diminishes the surrounding area of the chest, encumbers the oxygenizing action of the lungs, impedes the heart's power of propelling the blood with sufficient velocity through the various textures of the body, and, in consequence, diminishes the energy of the whole system, induces a lethargic and somnolent tendency in the functions of the brain, dilutes the strength and vitality of all the secretions which are immediately dependent on the circulation, and occasions the formation and deposition of fatty matter in lieu of some of the requisite renovation of muscle. The repletion of the stomach also weakens its mechanical action in consequence of excessive distention, enfeebles its secretive power in consequence of an overload of matter, and makes an exorbitant demand upon its gastric juice in consequence of the enormous scope afforded for the decomposition of the proximate principles of nutrition.

All food, like all other dead organic matter, has a tendency to resolve itself into its elements. It encounters a thorough resistance of this tendency, so as to pass into actual nourishment, partly by the direct reducing action of the stomach, and partly by the antiseptic power of the peculiar gastric secretion called the gastric juice; and when

it is swallowed in such a quantity as not to be wholly reducible by the gastric action and completely saturated with the gastric juice, some portion of it is decomposed, and not only ceases to be food, but forms putrid and noxious combinations, which irritate the intestines, and produce either actual disease or, at least, a morbid disposition. So long as an animal experiences the sensation of hunger, the gastric juice is poured out from the coats of the stomach in sufficient quantity to saturate the aliment that is swallowed; but that feeling once appeased, the secretion of the juice either ceases entirely, or its properties are so altered and weakened as to be no longer capable of offering due resistance to the putrefactive process. Thus, beyond a certain quantity, every mouthful of food, placed as it must be in the situation most likely to favor decomposition—namely, one of warmth and moisture—speedily becomes a putrid mass, evolving a large quantity of noisome gas (as does every animal or vegetable substance in this state), by which distention is increased and acidity and irritation produced.

Continued repletion, therefore, produces direct diseases of the stomach, the intestines, and the circulatory system; it produces, in particular, prevailing costiveness, occasional diarrhea, and continued feebleness of vital secretion; and it excites, or indirectly and slowly produces, many inflammatory affections, many chronic disorders, and almost all the morbid conditions of organs or functions to which different breeds or constitutions may be liable—in the viscera of one class of horses, in the brain of another, in the eyes of a third, and in the lungs or liver or other organs of the fourth. Even continued feeding, though neither the progress nor the aggregate of it should ever amount to actual repletion, is exceedingly injurious. The single and comparatively small stomach of a horse, just as really as that of

a human being, needs regular intervals of repose, and can not, without serious damage, be kept constantly working upon a continuous supply of food. It performs its functions in a progressive or serial manner, first liberally secreting gastric juice in preparation for a meal, next saturating the materials of the meal with the gastric juice, and working them up into a homogeneous mass, and next comminutes successive portions of the mass into the fine pulp called chyme, and discharges them into the pylorus on their way to yield up their nourishing juices to the system; and only when it has conducted most part of a meal through the whole process, or has nearly finished the reduction of the whole mass into chyme, does it return to a vigorous secretion of more gastric juice, preparatory to the reception and saturation and digestion of the contents of another meal. Hence the alternate disrelish for food and keen hungering for it on the part of a healthy and regularly feeding human being; and hence, too, the necessity, in both man and horse, of taking food in meals, and of completely abstaining from it during the whole of every interval between meals. The effect of putting fresh food into the stomach before the previous meal has been digested is either to excite the stomach to secrete fresh gastric juice, and so overtax its powers, or to send the food in a decomposed or decomposing state into the intestines, and so produce irritation and disease.

XIII. Objectionable Harness.—Custom is a perverse enemy to all advancement, and possesses no greater stronghold than it does among owners of horses. Harness should be made as light as possible compatible with strength and durability, so as not only to lessen the burden of the horse, but to allow greater comfort. There are many of the parts appertaining to a complete set of harness calling for reform, but as we intend only to call atten-

tion to such portions where improvement suggests itself, our remarks will be confined to winkers, collars, and bearing-reins.

Beginning with the smaller evil, we ask what benefit "winkers" confer on a horse, other than enabling him to catch the dust in his eyes, and preventing him from seeing what he is doing. Custom will reply that if a horse is worked without winkers he will be affrighted when he hears the noise of and sees the vehicle behind him. We can not realize why a distinction is drawn between saddle and harness horses—why the latter should and the former should not wear them.

Admitting that we have more command over a horse when in the saddle, which is asserted to be the reason for the non-necessity of winkers in saddle-horses, surely this should not subject a horse taken from riding and put to driving purposes to the evil of being demi-blindfolded. From the absence of winkers, the horse can see what is behind him, and knows that it is an inanimate body which will do him no hurt, having examined it in his mind's eye before being hitched to it; whereas, had he winkers, he would be ignorant of the true cause of the clatter, and more likely to be frightened. It would not be wise, except with docile horses, to discard winkers where they have always been used; but we should "break in" horses without them, thus giving the young horse confidence by allowing him to see what he is doing, and in some measure to use his own judgment.

For some years past there has been considerable agitation against the use of bearing-reins, which has not caused a corresponding decrease in their use, and which perhaps may be accounted for on the same principle as that clergyman understood who exhorted his hearers to do as he said, and not as he did.

Tight and continued reining causes poll-evil, strains the deep-seated ligaments and muscles. It assists the causes productive of megrims, and induces vice, such as jibbing and rearing. This should be sufficient to discourage their use against anything that can be advanced in favor of their retention. We are told that it gives contour to the neck; but where breed is lacking, no bearing-rein can remedy the defect by putting an arched crest upon a ewe-necked animal. Well, it keeps him up. Nonsense. The driver keeps his eye upon the animal he is driving, and at the slightest trip reminds his charge by a slight check, which has the effect, not of keeping him up, but of making him keep himself up. The reins, being held easily, though not carelessly, can be tightened or elongated to the easement of the horse when going down or ascending a hill, or to allow for the play of the head caused by the motion of the body. But the bearing-rein permits none of these. Do not think that when you see a noble horse standing in a carriage, tossing his head and clamping his bit, that it is his pride. No; he is endeavoring to obtain a moment's cessation of the pain inflicted by his head being constrained by the short rein.

If none of these arguments suffice for light harness, at any rate they should prevail for one class of horses. Any one who has noticed a heavy draft-horse begin moving an exceedingly weighty load—to exert greater power the animal lowers his head, and almost crawls along the ground; and yet such horses are universally provided with this rein. As in the case of winkers, we do not advise a general and immediate discontinuance of bearing-reins, as there are some sluggards who hang and depend on the bit; but if all young horses were taught to work independent of them, there would be but few subjects—and those from some natural defect—that would be benefited by their use.

But there is still another important part of horses' harness requiring amendment, and that is the collar, and which, from being constantly pressed against the neck, interferes with the free return of blood from the head. Further, it impedes respiration, produces fistulous withers, poll-evil, and other ills. Sore shoulders are of frequent occurrence, causing great inconvenience to their owners by throwing animals out of work. The substitution of a breast-harness would remedy most of the inconvenience of the collar. It affords a greater surface for pressure, being thus less likely to produce galls, besides having its bearings upon parts less affecting the breathing and superficial circulation.

The disuse of winkers and bearing-reins we are satisfied would be no loss. Of the abandonment of collars for breast-straps, we can see no cogent reason against. But we may safely maintain that custom alone retards improvements being made in horses' harness.



PART XV.

A FEW THINGS TO BE REMEMBERED.

I. Condition-Powders, Etc.—The so-called condition-powders are resorted to for the purpose of remedying a variety of ailments of the digestive organs which are due to debility, inactivity, and disturbed secretion, such as loss of appetite, dyspepsia, indigestion, chronic catarrh of the stomach and intestines, acidity of the stomach, etc. Among the ingredients usually employed are a variety of such as contain bitter, bitter-aromatic, and spicy properties, as gentian, calamus, wormwood, tansy, rhubarb, mint, caraway-seed, ginger, mustard, coffee, juniper-berries, valerian, anise-seed, fenugreek, fennel-seed; besides sulphur, saltpetre, common salt, Glauber's salt, black antimony, etc. Together with a variety of these materials, most, if not all, of the so-called food-tonics and condition-powders contain large additions of ground beans, corn-meal, oil-cake, flaxseed-meal, etc.

Most of the so-called condition-powders and cure-alls, highly lauded by the manufacturers and venders thereof, are compounded of waste materials and overkept, spoiled roots, herbs, and seeds, unfit for the retail drug trade or the prescription-counter, and the medicinal effect of which upon the animal economy is next to *nil*, if not actually injurious; and for such compounds, put up in packages, with labels printed in elaborate colors, prices are asked which exceed from 50 to 75 per cent. the actual value of the contents, even supposing these to be of the best quality.

The condition-powders sold in the trade, if they are of any merit at all, are not more effective than a combination of common salt with bitter-aromatic vegetables. Equal parts of common salt and wormwood, both powdered and intimately mixed, make a very good appetizer and digestive stimulant for cattle. Equal parts of common salt and gentian-root, both powdered and well mixed, make an excellent excitant and tonic for the digestive organs of the horse. To horses and cattle, these simple and effective ingredients may be given twice or thrice daily, a heaping tablespoonful at a time, mixed among oats, mill-feed, or steamed feed. But of whatever material condition-powders are made, they should not be used continually; and a good plan would be to use them during alternate weeks, and then only for such length of time as necessity may appear to require. Their use for animals in good condition and robust health is apt to prove injurious, by overstimulation of the vital organs.

For loss of appetite or digestive debility, the following two combinations are useful: Mix together in form of powder equal parts of common salt, gentian-root, and calamus-root, or equal parts of common salt, calamus-root (or wormwood or tansy), and juniper-berries; a heaping tablespoonful of these twice or thrice a day for horses or cattle, and one or two teaspoonfuls for sheep. When mixed among oats, this should be slightly moistened with water, to prevent the powder from being blown away. A good plan would be to take a double handful of the oats, moisten it and mix the powder with it, and then mix this with the balance of the ration, in which way it does not get too wet. The powder containing juniper-berries is especially calculated to also gently act upon the kidneys, when such action is desirable, as, for instance, during stormy, wet, and cold weather.

Another simple, but very effective, remedy in cases of indigestion, dyspepsia, or tardy digestion, consists of equal quantities (by weight always) of common salt and tobacco. The tobacco should not be in powder, but fine-cut and well mixed with fine salt, and given among food, the same as before stated.

A very good combination for use in cases of tardy functions of the liver, or in colds, catarrh, distemper, or strangles, consists of two drams of tartar-emetic, six drams of Epsom salts, and three ounces of calamus-root, all in powder. Divide into four parts. Give morning, noon, and night. This will, however, not be taken by the animal voluntarily, and is best given by mixing the dose with just enough molasses to make a stiff paste, which, with a flattened, smooth stick of wood, may be placed well back upon the root of the tongue. This may be continued from three to six days.

In certain disturbances of the physiological functions of the horse's stomach, sometimes called dyspepsia or indigestion, but which in reality are due to intestinal catarrh, there is generally a disproportion between pepsin and free gastric acid, whereby either the surplus or residue of this acid, or a scarcity of hydrochloric acid, is brought about. An excess of acidity will generally manifest itself in the dung, which will often have a marked sour odor, and show acid reaction. Normally, fresh horse-dung is alkaline. Among the causes due to management are irregular feeding times; too large allowances of food and water; coarse, bulky, and fibrous, or musty or otherwise unsound, hay and unsound grain; also too fast and greedy eating, so-called bloating, and consequent incomplete mastication of the food; fast driving too soon after watering; or faulty teeth, causing incomplete mastication.

The avoidance of such causes as may be ascertained to exist is of the first importance; otherwise medication would be useless, and no improvement could be expected. In regard to feeding, such a horse should not be given bran or bran-mashes while the bowels are loose. A good-sized lump of brown rock-salt, obtainable in most feed-stores, should be kept constantly in the feed-box. The horse will lick at this between meals, and satisfy the needs of the system. There is no danger of him taking too much. Besides being a stimulant to digestion, it is inimical to intestinal parasites. But if further medication should appear necessary, mix together one part of powdered carbonate of soda, five parts of powdered common salt, ten parts of powdered sulphate of soda, and ten parts of powdered calamus-root. Of this mix a tablespoonful with each food ration in the manner above suggested.

II. Blister.—Blistering constitutes one of the most effective appliances of the healing art, and is one of the chief remedies in a considerable number of diseases. The main principle on which it acts is that of counter-irritation, or of reducing inflammatory action in an interior organ of the animal system by exciting a stronger local inflammation on the nearest exterior part of the system; and a subordinate principle is the accelerating of the action of the nearest blood-vessels, or the rousing of the local absorbents to a temporary condition of unusual energy.

Blisters are eminently efficacious in dispersing such callous swellings as arise from strains, bruises, and other similar causes. They are of great service in reducing the inflammation of parts remote from the surface. Thus inflammation of the internal parts of the foot may be reduced by blistering above the coronet; inflammation of the bowels, by blistering the abdomen; and inflammation of the lungs, by blistering the sides. Blisters are also the best

remedies for curbs, windgalls, spavins, and various other disorders. When properly made and free from any such caustic ingredients as sulphuric acid and corrosive sublimate, they inflict no permanent damage on the skin, and do not prevent the hair from growing; and when they are not successful in the first application, they can, with all safety, be repeated. But a blister ought never to be applied to a part which is irritated or tender, for it might then produce extensive and virulent sloughing; nor ought it ever to be applied where there is a tendency to grease or scratches, for it would be likely to aggravate such disorders; and whenever it requires to be applied during winter, thorough care ought to be used to protect the animal from cold or from a current of air about the legs.

When a blister is to be applied, the part should previously be cleared as much as possible from hair, a quantity of the blistering ointment should be well rubbed into it, and a thin coat of the ointment afterward spread over the whole surface. A horse, on beginning to feel the action of the blister, is very apt to bite the part, and, in consequence, both to do serious mischief to the part and to blister his mouth. To prevent this, he ought to either be tied short or to have what is called a cradle placed about his neck during six to eight hours after the application of the blister. When a blister is applied to any of the legs, the bedding should be removed during the same number of hours; and if the hinder limbs are to be blistered, the tail should be tied up during the first day.

The most active ingredients in the great majority of suitable blisters are pulverized Spanish flies. One common blistering ointment for horses is composed of half an ounce of powdered Spanish flies, an ounce of oil of turpentine, and four ounces of hog's lard; another is composed of one and a half or two ounces of Spanish flies, half an ounce of

oil of origanum, one ounce of oil of turpentine, two ounces of hog's lard, and four ounces of common tar. Corrosive sublimate has frequently been recommended as an ingredient of blister; yet, except when very severe blistering, as in case of bone spavin or ringbone, is required, it ought in every instance to be omitted, for it is very apt to ulcerate the skin, and leave a permanent mark or blemish. Good mustard made into a paste with hot water, and applied hot, often blisters as well as ointment of Spanish flies, and ought to be used instead of the latter when a large surface is to be blistered, such as the sides, the abdomen, or the loins. Some of the preparations of iodine and mercury also make active blisters, and are sometimes used mixed with ointment of Spanish flies.

III. Poultice.—The pasty mass used for medical purposes, and to which the name of poultice is given, is applied moist and generally in a warm state, and, according to the purpose intended or the nature of the case, it possesses either emollient, anodyne, or astringent properties. The emollient poultice is the most common, and acts on the same principle as a fomentation, but more intensely and durably, and owes its virtue to the conjoined, continuous, and prolonged influence of heat and moisture. It is of great service for abating inflammation, relieving pain, cleansing ulcers, and disposing refractory wounds and sores to heal. It is eminently serviceable, and even indispensable, in many of the local inflammations and ulcerous diseases of horses and cattle, and may consist simply of boiled turnips, or of mashed carrots, or of a mashy preparation of linseed-meal, bran, hog's lard, and boiling water, or of linseed-meal alone made into a paste with hot water. The last of these is the simplest, and generally the best. The anodyne poultice is simply an emollient one, made with a strong decoction of poppy-leaves instead of water,

or containing a small admixture of opium, and it serves exactly the same purposes, with the addition of allaying pain; and when a very offensive smell proceeds from the ulcer to which it is applied, it becomes extra suitable by being made with a solution of chloride of lime, or by containing an intermixture of powdered charcoal. The astringent poultice is designed to cleanse by drawing, and may be made in any one of many ways, with such a substance as alum, or sugar of lead, or sulphate of zinc for its active principle; but this kind of a poultice is generally more injurious than useful, increasing inflammation instead of abating it. An emollient or an anodyne poultice may also be rendered injurious by any one of these admixtures, or else by making the poultice so small that it soon cools and dries, or applying it in so hot a state as to give unnecessary pain, or by fastening it on so tightly as to impede the circulation.

IV. Bran-Mashes.—During the season when horses can have no grass, or when they are kept for any length of time on dry food, bran is a useful adjunct to other food materials. It is rich in nitrogenous matter, but it is useless as a food given alone. Its gentle laxative effect is generally what we desire to bring about, and it is this which explains why it is valueless for feeding purposes. Its addition to other food materials may assist in the digestion of starchy principles. Most horses relish the admixture of bran among their food, but it is unnecessary to give it every day and in such unusual quantity as is often given, and in the long run such quantity would be apt to prove injurious in more than one way, especially if the horses at the same time were required to do much work daily. A good bran-mash once or twice a week is all that is necessary. When bran is given in large quantities, it undergoes fermentation in the stomach, producing colic, etc.; and

where it forms a regular article of daily diet, it is likely to produce calculi (stone) in the intestines, on account of the proportionally large quantities of magnesium phosphate it contains. A bran-mash should be made with boiling water, and remain covered up until cool enough to eat. When bran has become musty, or caked in masses, it is unfit for feeding.

V. To Manage a Broken-winded Horse.—In the peculiar state of the lungs of a broken-winded horse, the great labor of the abdominal muscles is absolutely necessary to bring about the proper arterialization of the blood; hence, under certain states of atmosphere, when there is less oxygen in a given space, or from, perhaps, some other peculiar changes in its electrical condition which we can not fathom, the difficulty of effecting the oxygenizing of the blood is greatly increased. If we urge a badly broken-winded horse into exertion, he will drop; he is thrown into a state of asphyxia, in which, if he should die, his blood will be found quite black. Indeed, in bad cases, as the disease advances to a fatal termination, we find the lining membrane of the nose and mouth turning purple, evincing the condition of his system. According to our present knowledge, nothing can be done to effect a cure, though happily it is in our power greatly to alleviate the distressing symptoms.

If we suppose the difficulty of breathing to arise from a gorged condition of lung (which is generally the case in any presumed cause of the disease), it is evident that any pressure against the diaphragm will increase the difficulty of breathing. Although the morbid appearance of emphysema of the lungs has not been found practically such a constant attendant cause of the complaint as is often supposed, yet the carrying out of certain principles has proved correct in the treatment; indeed, the practice

of regulating the giving of food and water so the horse is not obliged to work on a full stomach has its advantages in preventing broken-wind.

The palliative treatment of this disease consists principally in a proper system of dieting. The stomach must always be kept unloaded prior to work. Hay, which appears to have exerted a baneful influence in producing the disease, is to be given sparingly and little at a time, and always of the best quality. Give the greatest supply at night, dampening it. For a middle-sized horse, seven pounds are quite sufficient.

It may be asked, "Why give hay at all?" To which we can only answer, "Necessity obliges us to do so." It is a fact, we believe, well known in physiology, that concentrated food will not alone support life. The stomach must have a certain quantity or bulk to act on, and were we to substitute some sort of straw, we would only increase the mischief, since it would be found we must give more straw in proportion than hay, the former containing less nutriment in the ratio of three to one.

In whatever manner food is given, it is to be either dampened or contain a portion of bran-mash, and it ought to be of the most nutritious description, at the same time readily digestible in kind and form, in order to keep the dung in a softened state. A manger food, such as the following, seems very applicable: One part ground corn and two parts ground oats, with the addition of sliced carrots when they can be readily procured, they seeming to act beneficially in preventing the collection of flatus, which is so distressing to the animal.

The quantity of food and the proportions mainly depend on the size of the horse and the work he is to perform. If carrots are used in any quantity, a proportion of hay may be dispensed with accordant with the relative nutritious

value. The horse ought to be fed at least four times a day, but nothing for two hours before work. The broken-winded horse, like the roarer, is always eager for water; but give it sparingly, very often, and only a little at a time, the greatest quantity in the evening, and debar him from it for some time before his work. If fed on carrots or any succulent food, he will require less water.

VI. Blindness. — Blindness occurs frequently in horses, and very greatly deteriorates their value, rendering them useless for some kinds of work and only half useful for others. The causes of it are often too obscure or recondite to be detected before they produce their effect, or to be even conjecturally counteracted by any other means than the general good treatment of the animals. Two common but quite incurable kinds of blindness in the horse are amaurosis and the so-called moon-blindness; and a third kind is occasioned by ophthalmic inflammation.

The blindness of a horse, when induced, may be known by the uncertain, unequal, and hesitating manner of his gait, by his occasionally lifting the foot as if to step over an obstacle when no obstacle exists, by his pricking up his ears and moving them in a peculiarly listful manner when any person enters the stable, by his hanging back timidly and hesitatingly in his halter, and especially by the dilatation or contraction of the pupil of the eye under sudden transitions from light to darkness, or from darkness to light. But when a blind horse is mounted by an expert horseman, he may show none of the symptoms in hesitation of gait, but under the action of the whip, and from adroit management, may move with perfect resolution and freedom.

A horse blind in but one eye may, according to circumstances, either be very little or very much deteriorated. The loss of one eye does not enfeeble sight, because

the other acquires greater energy, though it must contract the field of vision. It is said to render the conception erring; and the case of misjudgment of distances is the one commonly brought forward to show this. But a one-eyed horse may not be absolutely condemned for the common business of the road or farm.

Blindness is much more frequent, but far less inveterate, among sheep than among horses. If almost any flock of sheep be carefully examined, the eyes of many of them will either show symptoms of partial or total blindness, or present indications of quite recent recovery from blindness of some kind. The most common causes are prolonged fatigue, hard driving, chasing about by dogs, burying beneath the snow, warm days followed by frosty nights in winter, and, as some think, the blowing of the pollen of flowers into the eyes, and sometimes either infection or some undefined description of epidemic influence.

In some kinds of blindness, the whole surface of the eyeballs has a light-blue color, resembling the color of deep salt-water when seen perpendicularly in clear sunshine; but in the more common kinds, a white film gradually spreads over it till the whole surface seems of a pearly whiteness. All the kinds, however, appear to be preceded or accompanied by inflammation; and when properly treated, or even sometimes when they are merely let alone, they, with few exceptions, gradually and speedily disappear.

VII. Choking of Animals.—Turnips, potatoes, apples, bits of carrot, of beet-root, etc., given to our large domestic animals, sometimes stick in the gullet. Cases of this kind being of a serious nature, the farmer should be made aware of the danger and of what is to be done on these occasions. We will lay down the best rules to follow in such an emergency. If the size of a whole potato or turnip sticking in the throat is not considerable, it may be

easily disengaged by reason of its rounded form. It is not the same, however, with pieces of beet-root or carrot; we have seen cows die of suffocation in a few minutes from this cause. The crisis has generally a longer duration, which permits the application of remedies. The means most commonly adopted is to push the thick, rough handle of a flexible whip down the animal's throat. This plan sometimes succeeds, but only at the imminent risk of more or less laceration of the gullet; and animals are frequently destroyed by such barbarous treatment. Another not less objectionable method consists in breaking down, by heavy blows with a mallet, the body sticking in the gullet, which by this means is bruised and lacerated.

When an animal shows the symptoms before described, passing the hand down along the left side of the neck, immediately behind the windpipe, will ascertain whether a foreign body is present. The obstruction being discovered, half a pint of raw linseed-oil may be given; gentle manipulation may be employed on the outside, above and below the obstacle, either to force it down toward the stomach or to bring it up toward the mouth. The latter result having been obtained, the tongue should be gently withdrawn by the left hand, while by introducing the right hand into the mouth, the foreign body may be grasped and removed. In such cases, the balling-iron is useful to keep the mouth open.

If these measures fail, recourse should be had to the probang, to push the obstructing body down into the stomach. In using this instrument, it will be necessary to have the head and neck held in a straight line by one or two assistants. The tongue must be gently withdrawn from the mouth, and the probang, having been previously well smeared with oil or butter, cautiously passed down into the gullet. On resistance being met with, gentle and con-

tinual pressure may be employed, under the influence of which the foreign body will generally, in a short time, pass down.

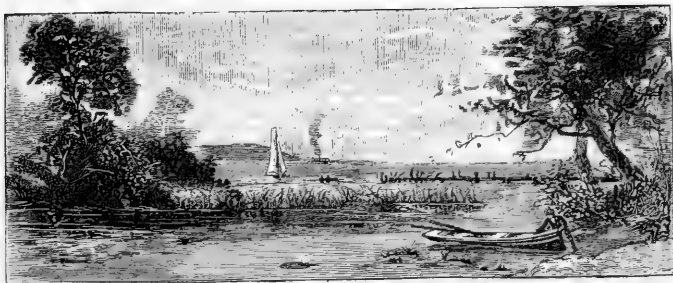
Bran and other dry food is sometimes impacted in the gullet, but the treatment above mentioned applies as well in these cases. After an animal has been successfully relieved from choking, it should be fed on gruel and similar sloppy food for a week afterward, as the gullet may have become more or less bruised by the removal of the obstruction. Choking in horses is comparatively rare as compared to that of cattle.

VIII. Hemorrhage.—Hemorrhages from deep or lacerated wounds, or from the cutting or rupture of moderate arteries, have far less morbid power in horses and cattle than in the human subject, and often are attended with no danger whatever in the former when they would be fatal in the latter; for, in consequence of the elasticity of the external tunic, the ends of the cut or ruptured vessels retract within the cellular substance and close their orifices, and the flow of blood, though at first copious and alarming, soon becomes slow, and eventually forms a coagulum, or clot, which plugs up the wound and prevents all further flow. Yet hemorrhage in cattle and horses may frequently be serious enough to make a great reduction of both condition and strength; and in every case, therefore, it ought, with all possible speed, to be artificially stopped.

Remedial applications to stay bleeding are called styptics, such as flour, puff-balls, alum, copperas, and other finely pulverized or powerfully astringent or corrosive substances, and where they are applicable in the form of powder or in that of lotion, act by coagulating the blood; but although these means may be successfully employed in cases of emergency in smaller animals, they have little or no effect upon a hemorrhage of either horse or ox. Com-

pression, by means of a dossil of lint, or a pledget of tow, or a piece of soft sponge, made fast with a bandage, is often effectual in any ordinary case of hemorrhage, and is particularly suitable when the place of discharge is beyond the reach of more special manipulation; and even when the application but partially closes the bleeding orifice, it may occasion the speedy formation of a firm clot upon the whole. The passing of a ligature of waxed silk or thin twine round the bleeding vessel is still more successful; and this may be effected by means of a so-called tenaculum, or of any small hooked instrument which can lay hold of the vessel and draw it a little from its place; or it may be effected by seizing the ends of the vessel with a pair of small forceps; or, in the least practicable cases, it may be managed by taking up some of the flesh or cellular membrane in two or three places round the vessel with a crooked needle having a waxed silk thread attached to it, and closing the included vessel by the constriction of the ligature upon the flesh. The instrument called a tourniquet is seldom applicable to the horse; yet, in the form of twisted ligature, it may sometimes be advantageously used in cases of wounds in the extremities. The cautery, or hot iron, may be applied when a bleeding artery or vein is not broken or cut asunder, for it readily stops the hemorrhage, either by searing up the tubular cavity of the vessel or by plugging up the orifice with coagulum; but it ought to be applied at such temperature as merely to sear the part and not destroy its vitality, for a part made dead by it will afterward drop off so as to reopen the orifice and renew the hemorrhage. Yet, in the horse, the seemingly mischievous act of completely separating a partially divided artery will stop the hemorrhage, for the ends of the separated vessel retract within the cellular substance and close up their orifices with coagulum. But when a large

vein is divided, it requires to be secured by one ligature above and by another below; and even when any very large artery is divided, both ends should, in prudence, if not in necessity, be secured with ligatures.



PART XVI.

SOME DISEASES AND DISABILITIES REQUIRING EXTENDED PRESENTATION.

Heaves, or Broken-Wind.—Broken-wind presents considerable resemblance to thick-wind, and is often preceded or immediately caused by that disease; and thick-wind and broken-wind jointly produce a gradation of distressing symptoms to which horsemen have given a series of expressive though inelegant designations. Some horses, when very fat, or when violently worked on a full stomach, suffer injurious pressure of the stomach upon the lungs, emit grunting sounds like those of a hog, and are popularly called grunTERS. Some, more from obstructions in the nose than from disease in the lungs, puff, blow, and violently distend their nostrils whenever they are more than very moderately exercised; and these are called high-blowers. Some, from contraction in the windpipe or the larynx, whenever they are for some time smartly exercised, emit a disagreeably shrill sound, and soon become greatly distressed; and these are designated whistlers. Some, when suffering with bronchitis, or when permanently afflicted with thick-wind, emit, at all times, a sound somewhat similar to that emitted by an asthmatic human subject when under slight exertion; and these are designated wheezers. Some, from permanent disease in the lungs, when worked into more than their usual rate of breathing by a little labor, emit a louder and harder noise than that of the wheezers, and are popularly designated roarers; and some

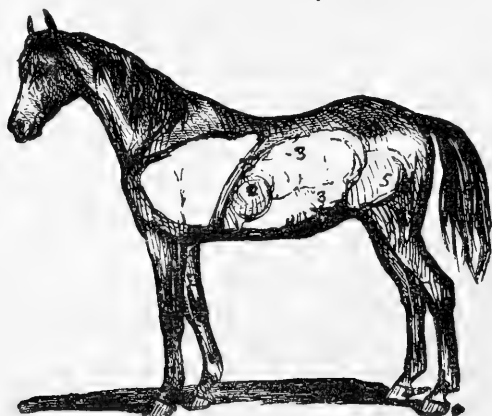
of this latter class, owing to contraction in the small passages of the lungs, emit a strong, shrill sound in quick breathing, and are designated pipers. But truly broken-winded horses are in a far more diseased condition, and exhibit much more distressing symptoms, than any of these classes.

A cough of a peculiar kind precedes and accompanies broken-wind. It usually begins in the form of a common cough; yet, in many instances, is not observed in its commencement or its early stages. It afterward becomes chronic, and is accompanied with the symptoms of thick-wind, and eventually assumes a short, guttural, grunting character, so decidedly peculiar to broken-wind that a professional horseman or horse-dealer is instantly apprized by it alone of the existence of this disease. The mere breathing of a broken-winded horse, also, is both distressing and peculiar, and exhibits the remarkable phenomenon of two acts of expelling the air for every act of inhaling it. The inspiration is both quicker and more labored than in a healthy animal; and the expiration is prolonged, elaborate, and painful to both lungs and abdomen. In the first of the two efforts of expiration, the usual muscles operate, and in the other the auxiliary muscles, particularly the abdominal, are put on the stretch to complete the expulsion more perfectly; and that being done, the flank falls, or the abdominal muscles relax with a kind of jerk or spasm. A sudden falling of the flanks indicates that the air is very readily inhaled; and a long-continued exertion of the abdominal muscles shows that it is slowly and with great difficulty expelled.

Though the lungs of a broken-winded horse are larger than their natural size, they appear to acquire the chief feature of their disease from a ruptured condition of some of their air-cells. Numerous air-bladders are often noticed

on the surface of the lungs after death, and these must have arisen from a rupture of some of the air-cells; for in that case some part of the air which is inspired will necessarily get into the cellular membrane of the lungs, and diffuse itself until it arrives at the surface of the lungs, when it will raise the pleura so as to form the air-bladders which we observe.

One cause of broken-wind is constitutional or hereditary tendency to contract inflammatory affections. Another



Relative Situations of some Internal Organs. (After Mayhew.)

1. The lungs. 2. The stomach. 3. The colon. 4. The diaphragm.
5. The situation of the bladder.

cause is the peculiar kind of organic conformation, such as narrowness of chest or fragility of membrane, which offers most resistance to a free expansion and a full play of the lungs. Another cause, or rather introduction and almost begun formation, is the disease of thick-wind. A fourth cause is plethora, or fullness of habit, occasioning an undue determination of blood to the lungs, an increase of the secretions within the air-vessels, and perhaps the production of acrimoniousness and viscosity in these secretions.

But a more frequent cause than any, and one which reflects much censure upon owners and keepers of horses, is violent exercise while the stomach is distended with water, but especially with dry food. Horses that are greedy feeders, or devour large quantities of slightly nutritious food, or are worked with a stomach distended by this food, are very subject to broken-wind. More depends upon the management of the food and exercise than is generally supposed. The agricultural horse is too often fed on the very refuse of the farm, and his hours of feeding and his hours of work are frequently irregular; and the carriage-horse, although fed on more nutritious food, is often summoned to work by his capricious master the moment his meal is devoured. A rapid gallop on a full stomach has often produced broken-wind.

A thorough knowledge of the nature and the causes of broken-wind is of great importance to every farmer; for, while the disease is both very common and very serious, the only effective means of dealing with it is prevention. Broken-wind might, in the great majority of instances, be fully and easily prevented, but when once formed it can never be cured; yet, in all its ordinary forms, it may be considerably alleviated. When a horse appears to be in its first stages, he may be given laxative medicine; and at all subsequent periods he should be regularly exercised, carefully fed, and sedulously protected from costiveness, and especially from violent exertion. He ought to receive water only in small quantities, yet so often as five or six times a day. He must never feed on such light and distensive matter as chaff or coarse hay; he may receive sparing quantities of oats and bran; he may eat somewhat freely of any kind of succulent food, particularly carrots; he may, in five days, be turned to grass; otherwise, he must be kept in a clean, well-ventilated stable, free from all foul

litter and ammonial vapors; and he ought, above all things, to have regular and long-continued exercise, and, at the same time, to be carefully kept from all such exertion as would, for even the briefest period, stimulate the action of the lungs.

II. Neurotomy.—By neurotomy, or nerving, the nerves of any extreme part of an animal are divided, in order to destroy the pain of a severe or laming disease in the region with which they communicate. The name, however, has hitherto been mainly applied to the dividing of the metacarpal or plantar nerves, as a remedy for laming diseases in the foot of the horse. When the nerves above the fetlock-joint are divided, all sensation in the foot is destroyed, and when the nerves below the fetlock are divided, a portion of the sensation in the foot. The dividing of the nerves above, therefore, is suitable in cases of lameness from severe quarter-crack, quittor, ringbone, and ossified cartilages, and the dividing of the nerves below is suitable in cases of lameness from contraction, navicular disease, capsular disease, punctures of the sole; and in tetanus, or lock-jaw, from injuries of the foot. The dividing of the nerve on only the affected side is sufficient in cases of quarter-crack, quittor, and ossification on only one cartilage, but the dividing of the nerve on both sides is requisite in all other cases. When the desired effect in the destruction of sensation is contemplated or thought desirable or needful for only a short time, the mere separating of the nerve, or nerves, is sufficient; but when this effect is contemplated or desired for a considerable period, a portion of the nerve, or nerves, varying in length from half an inch to an inch, according to circumstances, must be cut away, for the ends of a simply divided nerve commonly unite again in less than two months, so as then to restore sensation. But neurotomy in any form is unsuited to

cases of founder, convex soles, or pumiced feet. The operation may be a proper one in many cases; but the question may be asked, "Can the horse that has undergone the operation of neurotomy be afterward considered as sound?" In all candor, the reply must be that he can not be so regarded. There is altered, impaired structure; there is impaired action, and there is the possibility of the return of lameness at some indefinite period. He has been diseased; he possibly is diseased now; but the pain being removed, there is no means by which the mischief can always be indicated. Besides, by the very act of neurotomy, he is peculiarly exposed to various injuries and affections of the foot from which he would otherwise escape.

III. Interfering Horses.—Many horses are in the habit of striking with one leg against another, and much of ingenuity has been exercised to provide a remedy for the troublesome practice. Both the fore and hind legs are subject to it, the latter, perhaps, most frequently; but in them it is confined to the fetlock-joint, whereas in the fore-legs the horse may hit either the fetlock, the leg just above the pastern, or just under the knee, where it is called a speedy cut, from its occurring chiefly in fast action.

It is desirable before applying a remedy to ascertain, if possible, the cause, and the part which strikes, whether the shoe or the foot, and, if the latter, what part of it. Many horses strike from weakness, and cease to do so when they gain strength and condition. This is more particularly the case with young horses. Others cut from a faulty conformation of the limbs, which are sometimes too close to each other. Again, the toe is turned too much out or in. When turned in, the strike is usually just under the knee.

The objects to be kept in view in shoeing such horses must be to remedy the faulty action, and to remove, if possible, the part which strikes, which is generally that

portion of the foot between the toe and the inside quarter, sometimes the inside quarter itself, but very rarely the heels of the shoe. If the horse turns his toe in, in all probability he wears the inside of the shoe most; if so, it should be made much thicker than the outside; if the contrary, the outside heel should be the thicker. The shoe should be leveled off on the inside quarter, which should also be free from nails.

In the hind-legs, we often find a three-quarter shoe will prevent striking when other plans fail; for here the striking part is not so far forward as in the fore-legs, so that the removal of the iron altogether from the inside quarter will often accomplish the aim. It sometimes happens that no plan will prevent interfering, and then the only recourse is the boot or the pad.

IV. Some Disorders of the Horse's Mouth.—

The mouth is subject to certain affections, arising either from sympathy with other organs or from accidental causes; and disease may also extend from the inorganic structures of the organ to parts which are contiguous to them, and which are known to be endowed with much sensibility.

Lampas is a term used to signify a swelling of the palate or gums at the part in contact with or near to the front teeth, or incisors. It is generally found to occur in young horses, and, most likely, has more to do with teething than is generally admitted. Its treatment, so far as regards the swelling, is very simple, as the use of the lancet is all that is required. By merely scarifying the part, a copious flow of blood will sometimes be obtained, which to animals in high condition will have a most beneficial effect; the use of laxative medicine and succulent food should, at the same time, not be forgotten.

Deciduous, or wolves' teeth, or, as they are sometimes called, eye-teeth, occurring in some horses, are situated in

close approximation with the first molar teeth of the upper jaw. There is no foundation for the belief that their presence has any relation to diseases of the eye. Their presence does no harm or inconvenience to the horse unless, as they sometimes do, they deviate from their normal straight position and lean to one side, when, if they at the same time happen to be very pointed, they may wound the tongue or the cheek; in which case they may be easily removed with a pair of small pincers.

Caries of the teeth, although occurring but seldom in the horse, requires attention. The symptoms are quidding and a seeming dislike to masticate food, arising, no doubt, from acute pain in the act. Sometimes there will be a disagreeable odor emitted from the mouth, but this will much depend upon the stage of the disease; there will also be a staring coat and a general look of languor. It may become necessary to remove such teeth, for which purpose special instruments are used.

The loss of one or more of the front teeth sometimes occurs. This arises from the improper use the animal sometimes makes of them, from accident, or from the brutal usage which the animal gets at the hands of those whose interest it should be to keep him perfect as long as they possibly can. Such an animal is found not to do well when turned out in the grass-field; for the chief agents in the act of nipping being removed, he can not obtain his food with the facility which he otherwise would were they present.

Some of the symptoms mentioned accompany other diseases of the mouth, but are not of so serious a character as the last named; thus in old animals we have quidding, arising from inequalities of the teeth or a ragged state of their edges. This may be remedied by using a tooth-rasp; but sometimes other instruments are required for this purpose.

The mouth is sometimes injured by the bit or the curb from (in many instances) the unnecessary violence made use of in getting the animal "to a mouth," as it is called. In such cases, by removing the existing cause the effects produced will soon subside. There are some horses which are found to have contracted the habit of hanging back when tied in the usual manner to the manger, rack, or any other place. It is a most unpleasant habit, and is sometimes the cause of very great injury to the mouth, but often also to the tongue. When, from neglect or otherwise, the rein or halter is left in the mouth, we have seen the tongue nearly severed at about from four to six inches from its apex; but the precise cause of this injury is generally involved in obscurity, nobody having the smallest idea (or at least so they pretend) as to the cause of the mischief.

Aphthæ, or thrush, is an affection of the mouth of the horse and other animals, and arises from indigestion or the eating of acrid plants. If the first, it is generally accompanied by constipation of the bowels, small red spots upon the buccal membrane, and especially that part about the tongue. If vesicles are found, they may be carefully scarified, after which may be used, several times daily, injections into the mouth of a portion of an astringent lotion made of vinegar, honey, and borax, or alum.

V. Means of Preserving the Horse's Feet.—

Most people who have had anything to do with the care of horses will have noticed that while being shod the surface of the sole of the horse's feet is generally as hard as a slate—so hard, in fact, that no knife can penetrate it—and that the smith has to use a toe-knife and hammer. It is even the custom with many smiths to hold a hot iron to the surface of the sole, or to place hot cinders upon the sole for about half a minute, which has the effect of temporarily softening it, when he instantly pares off the

surface. In many feet, we also observe an extreme brittleness, or shortness of fibre, of the hoof for the space of an inch or an inch and a half at the bottom circumference of the wall. Now it may be proper here to discuss: Why is this hardness of the sole and brittleness of the wall?

INCLINATIONS OF THE PASTERNS.



A Long and Slanting Pastern.



A Natural Pastern.



An Upright Pastern.



An Overshot Pastern.

(After Mayhew.)

(a.) *Hardness of the Sole of the Foot.*—The opinion we have always entertained is that it was referable to the artificial state the feet are kept in, consequent upon domestica-

tion, working upon hard roads, and standing on a dry floor. It is a very frequent thing to hear horsemen recommend stopping the feet (especially the fore-feet) with cow-dung, or some such material, so as to enable the sole to absorb a degree of moisture and render it somewhat softer and more elastic, thus, as they will say, to some extent, at least, allowing an approach to a state of nature. With all due regard for their good intentions, we beg to state that they are deceiving themselves upon this point, for this hardness of the sole is referable to other causes than those above named. The fact is, nature has provided for herself, and there is really a sufficient amount of moisture in the horny sole to keep it supple and pliant under all circumstances, if only we will not interfere with it. Now, it has been the custom of nearly all writers to urge the necessity of thinning the sole until it will spring under the thumb; this is the interference of which we speak—this is the mistake. We are quite satisfied of this, that when cutting into the body of the sole we are cutting away horn that is not ripe, if we may be allowed the expression; by doing this, it appears to us we are exposing the living horny tissues unnaturally, and nature seems to make an effort to repair the damage by supplying horn of a harder texture; or this condition of the sole may in part be due to excess of evaporation or exhalation out of the exposed sole, and no care in stopping the feet can adequately repair the injury or supply the defect.

(b.) *Brittleness of Hoof*.—It has often been a question that has puzzled us not a little, how it is that feet which have been in the habit of being shod for some time, if they cast a shoe and have to travel a mile or two upon the road without it, or even when left at grass a day or two without one, how the lower circumference of the wall chips off and breaks up; whereas feet that have never been shod, or not

been shod for six months past, can travel barefoot on the road, or be at grass for months together without shoes, without the feet chipping or breaking up. Why is this? Upon what does this difference in texture depend? We have pondered the question much, have discussed it with many intelligent, practical, and experienced men, and the conclusion we have arrived at is this: that the deteriorated texture of the wall is not consequent upon any influence the iron shoe imparts to the wall, neither is it the result of jarring and concussion of the horn fibres for a certain distance up the wall, but it is purely and simply a condition of horn resulting from the outside skin or shell being removed from the wall by rasping; the pores of the horn are laid bare and exposed, excessive evaporation or exhalation follows, this in conjunction with an effort of nature to repair the damage by forming harder horn, consisting of less elastic texture. We know that this idea is pooh-poohed by many who never think it worth their while to reflect upon the facts in the case. Many shoers are so anxious to turn out their work, not only practically well, but highly finished, especially on fine carriage or road horses, that they will not only rasp, but smoothly file and sand-paper, the whole wall of the hoof, and then finish off by rubbing and polishing with a composition of linseed-oil, bees-wax and tar-oil. However, by this course we have found to our satisfaction that the brittleness of the hoof increased more and more.

In summing up the whole matter, we will say, simply remove the exfoliating or detached flakes of horn from the sole; level it passably, and do not pare into the living horn of the sole. Only rasp off all flakes around the extreme circumference or edge of the sole; shorten the toe, lower the heels, and be careful not to rasp, scratch, or wound in the least the delicate natural covering or skin of the wall of the foot, only so far as pierced by the nails.

VI. Care of the Horse's Hoofs.—Under the influence of dry heat, the hoof becomes hard, brittle, and reduced in size, but it does not, however, undergo this physical change in a sudden or marked manner unless other circumstances occur to contribute to it. The hoof is united to the subjacent tissue by an infinity of small prolongations, which yield to pressure by the imbibing of moisture—apt to be lost by ordinary evaporation; but if the crust or wall of the hoof has lost its thickness, or, on the other hand, the outer covering has been removed by rasping the feet up to the hair, by which the wall is rendered more permeable, and if, besides these causes, the animal has been standing inactive on dry litter, experience and observation prove that in a very short time the hoof will become dry and contracted. This modification in the form and size of the hoof determines, first, pressure on the parts, and afterward lameness. It is, therefore, objectionable to place animals on those conditions which cause them to lose the moisture of their hoofs. If it is impossible to put horses which are devoted to the service of the rich otherwise than on dry litter, it would be easy to wash their feet once a day, at least, with clean water.

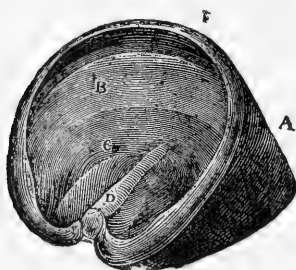
Injudicious rasping is practiced too frequently by the blacksmith, and it is the custom to replace the outer covering so injudiciously removed with an ointment, so as to prevent and oppose the evaporation of moisture. Grease is generally employed as an impermeable substance, but it is a bad agent; besides, it does not soften the dry crust, and by penetrating into the nail-holes compromises the security of the shoes, and when rancid it acts as an irritant to the coronary ligament. Alkaline substances, such as soda, potash, and ammonia, possess the property of softening the hoof and of disuniting its elements. The knowledge of this fact shows at once the mistake of allow-

ing horses to stand in wet, or dung impregnated with the ammonia of the urine, or in the barn-yard covered with a thick layer of manure. The moisture thus imbibed is loaded with ammonia, or the elements which constitute it, and which, by their alkaline properties, soften the horn, dissolve also that of the sole and frog, and cause ulceration. The new horn is dissolved almost as soon as formed, and the irritating fluid, acting on the denuded parts, causes, ultimately, a sort of fungous growth. It is evident from these facts that cow or horse dung ought not to be used for stopping the feet, or for poulticing. In preference, when there is an indication for restoring the lost moisture of the horn of the feet, use clay, linseed poultice, or clean water.

In conclusion, to preserve the horse's feet in as healthy a state as possible, it is necessary, first, to have good shoeing; second, to avoid the paring or rasping of the feet in the too common ruinous fashion; third, to keep the feet and legs clean; fourth, to abstain from trimming the hairs off the legs in winter; fifth, to wash the feet every day with clean water; sixth, to allow the horse moderate work or exercise, and seventh, when the outer delicate and glossy covering is accidentally destroyed, to replace it by some impermeable agent.

VII. Remarks about Horse-shoes and Horse-shoeing.—The shape or form of a shoe has very little influence on the functions of a horse's foot, the objects to be gained by any particular pattern being that it is light, will wear a month at least, not likely to be pulled off, and requiring few nails to retain it. But the methods of preparing the foot and applying the shoe, as generally carried out, interfere greatly with the healthy state and functions of the foot. In removing the old shoe prior to the horse being newly shod, each nail ought to be drawn by the

pincers independently, and the shoe not torn off, as is usually the case. The shoe being removed, the smith sat-



The Hoof.

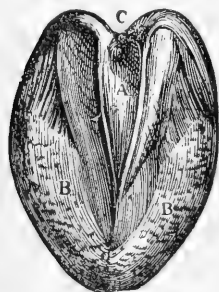
- A. Outer surface of crust.
- B. Inner surface of crust.
- C. Upper surface of sole.
- D. Part corresponding with the cleft of the frog.
- E. Coronary band.



Front View of the Foot, with the Hoof removed.

- A. Coronary substance.
- B. Laminae.

isfies himself as to the obliquity of the foot, which is readily done by allowing the horse to stand on a level floor, and himself retiring a few paces, so as to obtain a view of the angle formed by the front of the foot and the surface on which the foot stands. This angle should be about fifty degrees. If the obliquity is greater, or if, in other words, the angle be less than fifty degrees, a portion of the crust round the toe only and on the ground-surface should be removed.



The Under Surface of the Foot.

- A. Cleft of frog.
- B B. Sole.

C. Cleft between heels. Should the obliquity be correct, and there is a superabundance of crust, it should be removed by rasping and judicious even paring from toe to heel. When too great an obliquity exists, it is owing to the heels having been

pared or rasped more than the toe. Very few horses require any of the horn removed beyond what is done in fitting the shoe; the more horn there is below the sensitive parts, the less mischief nails do. By leaving sufficient horn, the nails are far removed from the sensitive laminæ. It is not absolutely necessary for a nail to penetrate the sensitive laminæ to cause mischief; for if the nail approaches it, the horn which becomes displaced presses upon the laminæ and causes considerable pain on a membrane so highly sensitive. When the fitting of the shoe is completed, it may be made sufficiently warm to make for itself a seating or bed, so as to insure the foot and the shoe having two planes as near as can be obtained. This can be done without destroying the texture of the adjacent horn. The crust which is thus removed, and by the previous operation of fitting the shoe, is generally found sufficient in working-horses to reduce the foot to a healthy size. The outer wall should under no pretense be rasped; the clinch should be simply knocked down, and not let into the crust by making a line with the rasp. Should any portion of horn project after the shoe is applied, it should on no account be rasped away, but left. If this is strictly adhered to, the hoof will not become brittle or split, and a shoe rarely, if ever, lost. The sole of the foot should be pared very little, and only so much as to prevent bruising by the shoe; nor should the frog be trimmed unless very ragged, and the ragged portions likely to collect and retain dirt and moisture, then the dead portions only should be cut off; but when a frog is not interfered with, but allowed to receive a due amount of pressure, it will be found fully developed in a short space of time. To recapitulate: Allow no paring or rasping that is not absolutely necessary; have plenty of horn left in which to drive the nails; use only small nails; do not allow them to be driven higher than

three-quarters of an inch, and have a light shoe made of good material. Prevent your horse from always standing upon an inclined floor when in the stable. Do not have his feet stopped, but merely washed. There is no necessity for the sole being soft, as the horse stands upon an arch, and is supported by the crust or wall. See that these simple rules are strictly carried out, and your horse will bring you safely over the roughest of roads, and will not be continually in pain when in motion.

VIII. Wounds in the Feet.—These wounds are dangerous according to the parts of the foot injured. Wounds in the anterior third are generally simple; and even when the bone itself is injured, there is not very much to fear. Wounds in the posterior third are also generally simple, unless, as seldom happens, the lateral cartilages should be implicated. Wounds in the medium portion of the foot are the most dangerous, from their liability to injure the foot-joints or the synovial sheath of the perforans tendon. The commonest place for the entrance of nails is generally at the side of the frog, about one to two inches from its point.

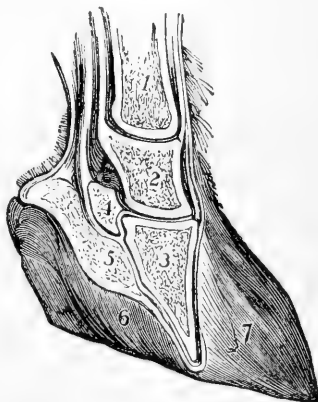
The symptoms are, in addition to great lameness and heat of the foot, much febrile disturbance and quick pulse; rapid breathing and sweating may be expected when we consider the nature of the part injured, its vascularity and sensitiveness, and its being confined in the hard, unyielding hoof. To form a correct diagnosis at the beginning and in the course of these injuries, we would suggest that the following things be particularly noticed: Degree of pain, position, depth and direction of the wound, the character of the discharge, and the complications in the coronary region. Let us suppose a case implicating the synovial sheath of the tendon. The first thing to be done toward treatment is to get the animal into a well-littered box-stall

—thus to tempt him to lie down as much as possible; then remove all the shoes, that on the injured foot last. The sole must then be well pared, not only just around the wound, but the whole sole, until it yields to gentle pressure. The wall, too, should be lowered in proportion.

In many injuries of the feet, we are averse to paring the sole; for, in some cases, paring to a large extent is apt to change the relative position of the wall and coffin-bone, as in laminitis, or founder. In the case instanced above, there is, however, no such danger, as there is never any weight thrown on the foot, the excessive pain causing the animal to be constantly holding it up.

There are cases in which local bleeding would do good; but as it would prevent the immediate use of what we place greater reliance on, namely, fomentations, we prefer to give a dose of physic. After poultices have been used for two or three days, bulging of a fungoid nature will be noticed round the wound of the sole, but more especially of the frog, with probably a discharge of synovia. This relieves the pain considerably, as shown by the abatement of the fever and the animal eating a little.

By continuing the poulticing for two or three days, more swelling of the coronet follows, and probably one or two circumscribed swellings, denuded of hair, will be vis-



Section of the Foot in Confirmed Laminitis.

- | | |
|--------------------|--------------------|
| 1. Os suffraginis. | 5. Frog. |
| 2. Os coronæ. | 6. Sole. |
| 3. Pedal bone. | 7. Wall or crust, |
| 4. Navicular bone. | greatly thickened. |

ible on the posterior part of the coronet. The falling off of hair we have always found to long precede the breaking of the skin. At this stage, we stop the poultices and apply a smart blister round the coronet, and use astringent dressings to the wound in the sole, binding them well on. The swellings, some days after the blister, will point and break naturally, discharging blood and serum with a portion of synovia, the flow of the synovia continuing. There is always a certain amount of sloughing when these abscesses break. Small abscesses of the same character, and at various parts of the coronet, will form and break out for probably a week or two. To check the flow of synovia, we use a mixture of sulphate of zinc and sulphate of iron, in equal parts, applying a portion as a plug over each orifice, carefully binding it on with a bandage, and not removing the bandage for three days. When abscesses have ceased forming, and the sores have healed up, another blister may be applied with benefit.

The animal will now be able to put the foot to the ground and bear some weight on it. We would then, if seasonable, turn him out to grass daily. If the wound on the sole has not healed up, nor the flow of synovia been checked, apply a strong ointment of tar and nitric acid, repeating it until healthy horn forms and the flow of synovia ceases.

When new horn begins to grow down from the coronet, it will be found to project over the old, giving the wall that existed before the injury the appearance of having shrunk considerably. This is caused by the thickening of the coronary band and the various tissues surrounding the coffin-joint, from inflammatory action. The animal will probably be very lame, even after all the wounds have healed up; but when the effects of the last blister have passed away, firing may be used, if considered necessary.

A week after firing, the animal may be turned out to grass. Examine the foot occasionally, and dress it with hoof-ointment, to expedite the growth of the new horn.

To get the animal useful, we should not always wait till he is free from all lameness, as experience has taught us that we expedite soundness by putting the animal to work and keeping him at it. The forced action of the foot while thus at work hastens the absorption of the organized material thrown out (which is the cause of swelling round the coronet), and thereby brings the coronet to its original form. When the navicular bone has become implicated, as it frequently does, lameness exists for a considerable time, but the animal may be used for slow work on soft ground.

We may here state that there is often much bother from what we should term bed-sores (sores on various parts, such as the shoulder, elbow, stifle, point of the hip, etc.), from the animal lying a great deal of the time on one side; and generally when he falls down in the early stage of his disease, it is with some violence. Abscesses may even form at some of these places. If the animal is able to move, and if seasonable, we prefer a soft old land grass-field to turn him into, in which he will lie down readily. He receives less harm in this than in the stable on bedding, however plentiful it may be.

When the coffin-joint has been the immediate seat of injury, death in four to ten days is inevitable. In such cases, it would be an act of mercy to destroy the animal at once.

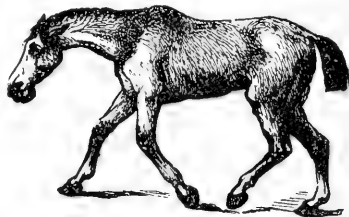
IX. Signs and Symptoms of Navicular Disease.—Navicular disease develops slowly and gradually, and without any striking symptoms. At first the horse will slightly favor the affected foot, fearing to tread hard upon it, whereby his movements become more or less safe, or stumbling. These incipient signs of the ailment

become less apparent during limited use, slow work, or on soft ground, but more so in the trot, and upon hard, uneven, or stony road. When at rest, or when standing in the stable, the affected foot is extended forward of its fellow, but so that the fetlock and pastern joints are not fully stretched, and rather slightly flexed, whereby the heel or quarters of the foot are either slightly raised from the ground or do not rest firmly on the ground. (In lameness of the shoulder or elbow, the foot is either slightly extended only, and resting flatly or more firmly on the ground, or else the horse will stand with the knee and lower joints flexed and the foot resting on the toe more or less back of a line with the heel of the other foot.)

From time to time, the horse with navicular disease will lift the extended foot in a feeling, careful way, and again let it down where it stood, whereby the lower joints appear slightly knuckling over. A stronger pulsation at the lower part of the limb is not always present, nor will there always be an increase of heat perceptible, though it may at times be more or less perceptible about the quarters of the foot. Sometimes an increased fullness of the coronet may be present. Strong pressure with the shoeing-pincers upon the quarters generally causes such horse to evince pain, but this will also be the case when there is a corn, or when the heel is low, or the wall of the hoof is naturally thin. When the frog is included together with the quarters in the grasp of the pincers, the horse will be more apt to evince sensitiveness or pain, which may indicate the existence of navicular disease, provided that the frog is sound and not affected with thrush or canker.

In the course of time, but generally not before several months have elapsed, the lameness will increase perceptibly, and by slow degrees the space between the quarters of the hoof will become narrower; or, in other words, the hoof

will become more or less contracted, the sinking in of the wall beginning just below the coronet, while the sole will appear as if more or less drawn up or concave, and the frog will shrink correspondingly. The foot will look narrow at the heel, and if only one of the fore-feet is diseased, the contraction of the affected foot will become more noticeable by comparing the size and shape of this foot with its fellow. In chronic cases of navicular disease, there may also be more or less wasting of the muscles, or so-called *sweeny*, of the arm and shoulder, and sometimes more or less distinct rings around the wall of the hoof, which latter, however, may also appear in consequence of laminitis, or so-called *founder*.



Much difficulty in diagnosing a case of navicular disease is often met with, especially where the size and shape of hoof are not much changed, where no signs of the generally passive inflammation are noticeable, especially when both fore-feet are equally less affected, and where, as in many chronic cases, the lameness is not very pronounced. The fact of a horse standing with one foot extended, or "pointing," as it is termed, must not be considered a positive sign of lameness or disease of that limb or foot, for there are horses who will point from habit, and without any disease or lameness existing in that foot; but such habitual pointing will, as a rule, be found co-existing with the pointing of a hind-foot, which he would not do in the case of lameness of a fore-foot.

As in the case of shoulder lameness, so with navicular disease, the lameness becomes more distinct when the

horse is made to trot, but with the difference that the horse with the disease in the foot will show lameness most on hard or stony road, and very little, if any, on soft ground or a plowed field; whereas the horse that is lame in the shoulder or elbow will go equally lame on hard or on soft ground. In navicular disease, the lameness will gradually diminish during continuance of exercise or driving, to again appear after a short rest. The horse with navicular disease has a peculiar tripping or short step, which peculiarity is commonly called grogginess.

In obscure cases of lameness, we may suspect some bone disease, such as incipient ringbone, as the cause, if the horse stands level in the stall, but trots very lame on hard ground. Lameness decreases with exercise, except, as a rule, in cases of splint, ringbones, side-bones, sore shins, corns, chronic laminitis, or founder, villitis, and sprains.

X. Abnormal Condition of the Teeth.— Disorders of the teeth occur frequently in colts between the ages of two and a half and four and a half years—the period for the temporary teeth to be changed for the permanent—when they are very much out of condition, being, as it is termed, very lean on the ribs, and having long, harsh, and shaggy coats. Owners say they feed pretty well, but their food does them little good. Now, if the mouth be examined, the cause will, very probably, at once present itself. It is found very hot, and contains a large quantity of saliva, the result of irritation produced by dentition, which process, it is likely, has been perfected on one side, although the reverse is the case on the opposite; by which we mean that the temporary teeth on one side have been shed and their places supplied with permanent ones, while on the other the temporary remain fixed or are only partially displaced, adhering to the gum, perhaps, by

one fang, leaving a portion unattached, and producing considerable irritation, also materially impeding the masticatory process.

It will be requisite in this case to remove the shell by means of a pair of shell-tongs or forceps; also, if the shell or grinder be firmly attached, we must have recourse to the same expedient, supposing the process to have gone on properly on one side, and it is the period for the permanent to supplant the temporary tooth. We shall thus facilitate and expedite the development of the permanent tooth, and the animal will be enabled to masticate his food with more ease and more effectually. It may also be necessary to rasp the edges of the other grinders, which may have become morbidly sharp and pointed, the result of inefficient mastication.

As it is generally early in the spring, when there is a deficiency of nutritious grass, that our attention is more generally directed to these cases, it is advisable to feed with bran and cut hay, which the animal will eat with less difficulty and less waste than uncut feed. In those becoming greatly emaciated, the administration of tonic medicine will prove very essential in restoring the lost tone and energy of the digestive organs. The important process of dentition is accompanied with much more marked effects upon the system in some colts than in others; and it is not an infrequent circumstance to observe, that out of several running together, one or two will do badly during this period, whilst the others will maintain a tolerable condition, yet all are receiving the like treatment.

Morbid or exuberant growth exists in two forms. First, it is general, and confined to the borders or edges of the teeth—the outer edges of the upper molars and the inner of the lower. The upper teeth normally somewhat overlap the lower externally; consequently when the mouth is shut

the outer edges of the upper and the inner of the lower are unopposed. Secondly, one or more of the dental organs may be increased in size to such an extent as to project considerably above the level of the rest; say an inch, more or less. Our attention is called to the first-mentioned class of cases when we notice a considerable quantity of unmasticated grain voided with the dung, and saliva secreted in an undue degree, evidenced by its driveling from the animal's mouth. On examination, we shall find that there are numerous sharp projecting points extending from the unopposed edges of the molars, which have caused lacerations of the lining membrane of the cheeks, and probably, also, of that of the tongue.

The treatment here is simple. We must at once remove the offending agents by means of the tooth-rasp, in the exercise of which we must be careful to effect our intentions with as little injury to the mouth as possible; for it is comparatively rare that we do not bruise the mouth in a greater or less degree, this being dependent on the expertness of the operator and the tractability of the horse. For facilitating the act of rasping, a so-called balling-iron is generally used.

With regard to the cases in which we find one or more of the teeth projecting considerably above the level of the rest, bare inspection tells us that this state offers a far greater impediment to the proper and effectual trituration of the food than the preceding one; but we may readily obtain additional demonstration of the fact by giving the horse a small quantity of hay, when we shall perceive that he has the greatest difficulty in masticating it. He will, however, employ every possible means to do so. He turns his head from side to side, with a peculiar twisting action of the lower jaw, frequently forcing the mass by the action of the tongue to the bottom of the mouth, and as fre-

quently passing it up again; until, at last, he lets it fall out, a roughly chewed mass, which is called a "quid," and the horse is called a "quidder."

It is in consequence of these quids being found in his manger that the horse's mouth is suspected to be amiss, In this instance, the rasp is unavailable; but, having ascertained which is the offending tooth, we must have recourse to the tooth-shears, or to the various kinds of chisels made for such cases.

XI. Diseases of the Horse's Teeth.—The diseases of the horse's teeth, as well as the proper treatment of them, differ considerably from those of man. Feverishness, loss of appetite, diarrhea, and a number of other and widely dissimilar affections, either arising wholly from difficulty in dentition or more or less severely aggravated by it, are so frequent in young horses that whenever any of them occur, and are found on examination of the mouth to be accompanied with prominence and pushing of the tushes, a crucial incision ought to be made upon the gums. The grinders of horses more advanced in age are apt to become roughened in the edges, from irregular growth or from irregular wearing of the enamel, and may in this state give rise to bad ulcers in the mouth, and ought to be rasped smooth. Part or whole of a back tooth or other grinder sometimes grows to a higher level than the rest of the teeth, and penetrates the bars above it, causing serious ulceration, or interferes so constantly and ruinously with mastication as to occasion a general pining for want of due food; and whenever any such overgrowth is detected, it ought to be reduced to the level of the other teeth. A general irregularity in the surface of the grinders, though not marked by any very observable prominence in any one part, is sometimes so great as to occasion quidding, and to constitute great and almost incurable unsoundness.

Caries, or rotting of the substance of the teeth, occurs more or less in all animals, but is peculiarly frequent and virulent in man, and especially so in those members of the human family who think themselves most highly civilized. One cause of this disease in man is the want of a due degree of dental action, occasioned by the luxuriousness or soft forms of food; another is the rapid and mighty whirl of chemical forces acting on the teeth, from the great diversity and rapid succession and piquant nature of the articles of diet; and a third, and chief, is the adherence to the teeth or their interstices of small particles of easily decomposable substances, such as flesh - meat or animal sauces, or almost any of the mixtures of the most-relished dishes. Decomposition of the particles is rapidly effected under the combined action of the heat and moisture of the mouth and the oxygen of the atmosphere, and an acid results which immediately attacks the phosphate of lime in the teeth, and after awhile so far accomplishes its decomposition as to bring the teeth to incipient decay. A little hole appears which henceforth constantly lets in the atmospheric air, the salivary secretions, and the decomposing particles of adhering food; and unless this hole is promptly stopped with some proper composition, a rapid decay of the entire tooth, on to its destruction, is inevitable. Caries, though incomparably rarer in the horse than in man, yet sometimes occurs with such virulence as not only to destroy one tooth, but to communicate the rotting to neighboring teeth, and even to the jaw. When a carious tooth is found in the horse's mouth, it should be extracted.

PART XVII.

DISEASES OF THE HEAD, BODY, AND INTERNAL ORGANS.

Continuing the abstract of Doctor Paaren's writings in THE PRAIRIE FARMER, we come to a selection of the diseases pertaining to the head, body, internal organs, and viscera, as presented from time to time in its columns, and in answer to descriptions of diseases by farmers, breeders, and other horse-owners.

I. Diseases of the Head.—(*a.*) *Glanders.*—Glanders mainly affects the nose, gradually extending to the throat and the lungs. Pustules or blisters form in the lining membrane of the septum, or the wall separating the nasal cavities. Often these pustules are seen inside both nostrils, often only within one nostril, and then most frequently the left one. They break and leave small ulcers with uneven, inflamed, and thickened edges. These ulcers gradually increase in size and in number, and several of them may run together and thus become very irregular in shape, with one or more deep depressions. Thus not only the nasal mucous membrane is destroyed, but also the nasal cartilage. There is also a discharge, first of a watery, thereafter of a clear, slimy, and later of variously colored, gluey, or sticky secretion, having a tendency to dry and form dark crusts on the edge of the nostrils.



The proof of Glanders.
Pustules in the Nostrils.

In the hollow of the lower jaw, and adhering close to one or both jaw-bones, is a hard, nodular swelling of the glands, largest on the side on which is the most affected nostril. According to the progress of the disease, more or less frequent cough and sneezing or snorting may exist.

Farcy affects the superficial lymphatic glands and vessels, showing itself in painful corded swellings on various parts of the body, but especially between the hind-legs and on the neck and the head. Gradually the tumors, which are called farcy-buds, break and discharge unhealthy-looking pus.



Farcy on the inside of the Horse's Thigh, where the skin is thin and the hair almost absent.

There are two forms of farcy and glanders, acute and chronic, and both highly contagious, especially glanders, which always proves incurable, though in its chronic form years may pass before the fatal termination ensues. It is seldom that either farcy or glanders terminates singly; that is, the animal generally dies with both diseases developed, and especially when the disease began with the symptoms of farcy, which clearly show their close relation or identical nature.

With a view of shedding light on the important question of the contagiousness of glanders, we will mention the following deductions from facts brought forth by our own experience:

1. That farcy and glanders, which constitute the same disease, are propagable through the medium of stabling, and this we believe to be the more usual way in which the disease is communicated from horse to horse.
2. That infected stabling may harbor and retain the infection for months, or even years; and though by thor-

ough cleansing and making use of certain disinfecting means the contagion may probably be destroyed, it would not, perhaps, be wise to occupy such stables immediately after such supposed or alleged disinfection.

3. That virus (or poison of glanders) may lie for months in a state of incubation in the horse's constitution before the disease breaks out. We have had the most indubitable evidence of its lurking in one horse's system for the space of fifteen weeks.

4. That when a stud or stable of horses becomes contaminated, the disease often makes fearful ravages among them before it quits them; and it is only after a period of several months' exemption from all disease of the kind that a clean bill of health can be safely rendered.

[NOTE BY THE EDITOR.—When glanders or farcy is suspected, a competent veterinarian should be called, and, the disease identified, the animal should be killed, and completely burned or deeply buried.]

(b.) *Chronic Catarrh (Nasal Gleet) following Strangles or Distemper.*—

The bone just under the left eye protrudes about three-fourths of an inch. The health otherwise is good, except cough a little at times.

Similar symptoms may also exist in certain chronic constitutional diseases, such as anæmia and glanders, besides in catarrh of the frontal or maxillary sinuses. In chronic nasal catarrh, also called nasal gleet, the constitution should be supported by liberal nutritious feeding, and the use of vegetable and mineral tonics, such as a powder composed of half a dram each of sulphate of copper and sulphate of zinc, and three drams of powdered gentian-root or calamus-root, which may be given every evening, mixed among a ration of ground feed. This may be continued during a fortnight, and after fourteen days renew as before, and so on during alternate fourteen days, so long as it may appear necessary. Injections may be made carefully, twice daily, up through both nostrils, of a solution of half a dram of sulphate of zinc in a pint of blood-warm water. The horse should be housed or sheltered during stormy or wet

weather and during cold nights. If the disease is glanders, no treatment will be of service, and great danger would be incurred in handling such an animal, as this loathsome disease is communicable to mankind through sores on the fingers or hands, or from picking the nose with the fingers, or rubbing the eyes, or getting the nasal fluid from the horse blown into the face, etc. If sores or ulcers can be seen inside the nose, and the glands under the jaw are hard and swollen, the disease is likely to be glanders, and the sooner the animal is destroyed and deeply buried the better, after which the stall, manger, halter, harness, and everything with which she has been in contact, should be thoroughly scraped and cleaned, and thereafter soaked with a strong solution of chloride of lime.

(c.) *Tooth-Blindness.*—

Do so-called "wolf-teeth" in horses ever cause blindness? Do any kind of teeth ever cause loss of vision?

It is a prevailing opinion among horse-owners that the supernumerary small and rudimentary teeth in front of each upper row of grinders are productive of certain diseases of the horse's eye. This is a mistake, as there is no connection whatever between these teeth and the eyes. These teeth generally drop out with the shedding of the milk-teeth, or before the fifth year, but occasionally they remain. Very rarely they diverge from their straight or normal position to one side or the other, or have a sharp point, in either of which cases they may cause wounds in the tongue or the cheeks. They should then be drawn out with a pair of small nippers, but never be jerked or knocked out, as thereby is caused unnecessary pain and soreness of the gums, or other accidental injury. Extensive disease of the upper grinders, by which the maxillary bones become implicated, may involve the eye-socket, and consequently the eye itself, mechanically. The same may happen in so-called big-jaw; but such cases are rare.

(d.) *Turn Sick in the Horse.*—The presence within the skull of one or more hydatids, or so-called bladder-worms, originates from the ovæ, or minute eggs, of tape-worms. This disease is more frequently met with in sheep under

two years old, less frequently in young cattle, and very rarely in the horse and the goat. The first symptoms of this disease in the horse may be, and probably often are in its first stage, mistaken for those of sleepy staggers. There are three stages of development in this disease. The first stage generally occurs during the latter part of summer or in the fall of the year, and consists in more or less severe irritation of the brain in consequence of the immigration of the embryo into the brain, and which stage has an average duration of eight to ten days. After this (if the animal does not succumb during convulsions) there is a stage of latency (the second stage) lasting from three to five months, during which the animal is apparently healthy. The last stage, which generally occurs late in the winter or toward spring, generally ushers in with gradually increasing dullness, later with a peculiar uneasiness, during which, when left loose, the horse will walk around like a horse in a circus, generally turning around toward the same side, right or left, the side toward which he turns being the side of the brain at which the bladder-worm is lodged. During this stage, which may last from one to two months, the horse is more or less frequently seized with cramps or convulsions, due to pressure upon the brain from the hydatid, which gradually increases in size. Between the fourteenth and twentieth day after its entrance into the brain, the embryo hydatid (or coming so-called bladder-worm) is about the size of a hemp or millet seed; between the twenty-sixth and forty-second day, it reaches the size of a large pea; between the fiftieth and seventieth day, the size of a hazel-nut; and later it increases from the size and shape of a pigeon's egg to that of a goose's egg, and even larger. The hydatid, when taken out whole, now looks like a soft egg, or rather like an egg without a shell, and contains a clear, watery fluid. The inner coat of this cyst

is dotted with numerous minute protuberances, or nodules, which are capable of slight elongations at will, and which are so many heads of future tape-worms. The symptoms of this disease in the horse, ox, and sheep are caused by the gradually increased pressure upon the brain by the presence of one or more of these cysts or so-called bladder-worms within the skull. Very rarely such cysts may wither and not become developed. It does not happen in more than two per cent. of cases. The balance, or ninety-eight of every hundred of such cases, are doomed to die, death generally resulting from atrophy of the brain, or paralysis of the same, with gradual and general wasting away of the body. No medical treatment can exert any influence upon this disease. The only treatment promising any relief consists in the removal of the hydatid from within the skull by a surgical operation. While this operation often proves successful in lambs, young sheep, and calves, its application on the mature ox or on the horse is almost out of the question, except when the cyst happens to be found located under the bones of the forehead or temple. To correctly diagnose its location, and to properly perform such an operation upon a horse, requires a more than average skill in the operator.

[NOTE BY THE EDITOR.—Dogs should never be fed with sheep's heads unless thoroughly cooked. Wherever the excrement of dogs is found in pastures, it should be destroyed.]

(e.) *Slobbering*.—This horse had sore tongue, slavered, and had difficulty in eating. The reply was: It is very likely that something is wrong with the molar teeth, or grinders, which should be carefully examined for sharp edges or projections. Some splinter of wood, or bone, or other pointed body may have become wedged between two teeth, and cause wounding of the tongue for every movement of the mouth. If the teeth are found to be very irregular, or

sharp-pointed, they should be leveled with a proper tooth-rasp. The horse should be fed on mill-feed or steamed feed.

(f.) *Irregular Shedding of Teeth*.—D. B., Lawrence, Kan. In young animals, it not infrequently happens that the shedding of the so-called milk-teeth, or colt's teeth, presents irregularities which cause difficulties in mastication of food, loss of appetite and condition, etc. When a milk-tooth becomes wedged between its two neighbors, the permanent tooth, shooting up from beneath, pushes the milk-tooth to one side, either inward or outward, and the permanent tooth may thus mechanically be prevented from assuming its natural position or direction. The consequence is either a bruising or lacerating of the gums, the cheek, or tongue, as the case may be, and difficulty in chewing the food. Such cases require surgical interference as early as possible, by means of instruments adapted for such purposes, and a skilled veterinarian to perform the operation. The chisel and mallet style will only be likely to make matters worse, and endanger the future usefulness of the animal.

(g.) *Crib-biting*.—C. H. S., Edgar, Neb. This habit may be regarded as either the effect or the cause of indigestion, though it often proceeds from idleness, and from one horse imitating another that is cribbing. Place a cribber in a stall where the manger is lower than his knees, and let the lower part of the hay-rack, as well as the window or air-hole, be higher than the top of his withers. The arrangement of the muscles of the



Muzzle for Crib-biter.

horse's neck and jaw is such that he can only practice the act of cribbing when these can be brought into exertion at a certain leverage. Therefore, remove all protruding objects within the heights mentioned, as he can not crib when stretching the head up or down. When young horses are noticed to continually lick their manger or the wall, which generally precedes the habit of cribbing, the above arrangement should be made forthwith, and some common salt kept continually within their reach; the habit may thus be effectively prevented in the start.

II. Diseases of the Eyes.—(a.) *Common Inflammation of the Eye.*—Common ophthalmia in the horse is usually sudden in its attacks. The cornea becomes slightly dim, the white of the eye becomes marked with red streaks, the inside of the eyelids becomes red, the general substance of the eyelid becomes swollen, and the eye ceases to be able to open itself fully, and makes a discharge of tears; but the animal is not at all affected in his general health, and continues to feed with full appetite and work with an unabated vigor. The causes of the inflammatory action are sometimes catarrh and other slight affections of the respiratory system, but more commonly mechanical injuries, such as blows, scratches, or the lodgment of some bit of seed, or husk, or dirt, which the haw of the eye can not reach or eject. The inflammation will, in many instances, disappear of itself. But irritating substances within the eye must be sought for and removed; and all bad or obstinate cases ought to be treated with either lotions, fomentations, astringent applications, blistering, or topical bleedings, or with two or more of these remedies, accompanied by cooling diet and gentle physicking, according to the particular symptoms and circumstances.

Secure the head, and turn the upper eyelid inside out, to ascertain if any dirt or ingrowing hairs are present, in

which case remove the same. Then bathe the eyes frequently with blood-warm water or milk, by means of a soft, small sponge. Place the horse in a darkened stall, and after a day or two apply twice daily a sufficiency of a mixture of two drams each of laudanum and fluid extract of belladonna and a pint of soft water, or rain-water.

(b.) *Periodic Ophthalmia*.—H. E. S., Elderville, Ill.:

A mare eight years old, whose eyes, first one, then both, would become blue and watery; all visible parts of the ball looking the same color. It would remain so for about a week, then it would apparently be all right for several weeks, gradually becoming more frequent; and the mare is steadily losing her eyesight. Her eyes have never been hurt.

This disease, which is also known by the name of moon-blindness (though the changes of the moon have nothing to do with its appearance), may be caused by want of ventilation and drainage of stables, a plethoric state of body, irritation consequent upon shedding of the teeth, etc. It is peculiar to heavy and coarse breeds, especially on lowlands, and it is transmissible from parents to offspring; hence, sires or dams thus affected should not be used for breeding purposes. By way of treatment, place the horse in a darkened stall, and having given one or two rations of bran-mash, administer a purgative ball composed of five drams of aloes, one dram of calomel, two drams of nitre, one dram of capsicum, and mucilage sufficient to form a ball. Bathe the eyes thrice daily with warm water, by means of a soft sponge, and apply between the lids, by means of a small camel's-hair pencil, a sufficiency of a mixture of half an ounce of Goulard's extract, one ounce of fluid extract of belladonna, and one pint of distilled water. Externally, apply to the eyelids and to the hollow over the eyebrows a small portion of fluid extract of belladonna. Give fresh grass instead of hay. The disease is not permanently curable; but the known causes, if removable, should be removed or avoided. Generally, periodic ophthalmia finally terminates in cataract, producing permanent blindness of such affected eye.

(c.) *Traumatic Ophthalmia*.—Procure an ointment of one dram of calomel and half an ounce of pure vaseline (not carbolized). The calomel should be very thoroughly mixed with the vaseline. Of this apply between the eyelids as much as the size of a pea three times daily. Or the following ointment may be used in the same manner: Mix thoroughly together one scruple of red precipitate and half an ounce of pure vaseline. It would be a good plan to use both of these ointments; that is, one of them during one week and the other during the following week, and so on during alternate weeks.

(d.) *Pink-Eye, So-called*.—W. F. E., Dwight, Kan.:

A yearling colt and a mare suffering from what is here termed pink-eye. Symptoms are a discharge at nostrils and eyes; eyes almost closed, having a red appearance in the eyeballs; loss of appetite and general weakness.

Good care and nursing constitute the main treatment. Give ground or steamed feed, cold flaxseed-tea to drink instead of water. Prevent exposure to draft or wet; give ample bedding. In case of soreness of throat, apply liniment of ammonia and light flannel bandage. When the animal is much debilitated, give among the food, morning and evening, a powder composed of a dram of carbonate of iron and an ounce of powdered boneset. No exercise until recovery.

III. Diseases of the Skin.—(a.) *Hide-bound, Etc.*
—W. W., Lancaster, Wis.:

A brood-mare has been out of condition for about a year. The symptoms are hide-bound and either diarrhea or costiveness. Her eyes seem a little sunken.

Discontinue feeding with dry, bulky food, and make frequent changes, giving oats and corn ground and mixed with bran; also give once a week a mess of steamed or cooked grain mixed with finely cut, sound wild hay. Among the food may be mixed, every evening during alternate weeks, a tablespoonful of a powder composed of

one pound of flowers of sulphur, half a pound of flaxseed-meal, four ounces of black antimony, and two ounces of saltpetre. Give proper shelter and liberty out-doors daily when the weather is fair.

(b.) *Pityriasis (Skin Disease)*.—G. R. W., Tennyson, Ind.:

Horse appears to be in good health and in good order (fat, in fact), but he rubs his mane and tail continually, and keeps it rubbed almost naked.

The ailment complained of is generally met with in horses which, while they receive liberally of nutritive food and are fat, yet suffer from want of proper daily allowances of elbow-grease. Reversing these proportions for a short time, and thereafter in a manner equalizing them, is almost all that is required. In an aggravated case, as the present, we advise daily washing with soft soap and warm water; and after rinsing with cold water and drying, apply to the affected parts a sufficiency of a liniment made of one part of Goulard's extract and fifteen parts of cotton-seed oil, or a mixture of one part of creosote and carbolic acid and thirty parts of cotton-seed oil. Internally may be given bicarbonate of soda in doses of half an ounce morning and evening, mixed among small rations of ground feed, during one week or ten days. During days of fair weather, give liberty on pasturage.

(c.) *Œdema*.—D. H. B., Madrid, Neb.:

A two-year old became covered with large pimples, which, by rubbing and biting, soon became sores. Noticed a swelling under his body from the fore-legs backward. It appears to be filled with liquid of some kind, and is largest just back of the navel.

Mix together half a dram each of powdered camphor and sulphate of iron, and half an ounce of powdered or ground juniper-berries; add to this as much flaxseed-meal, and with molasses make a thick paste, to be applied with a flattened, smooth stick of wood upon the root of the tongue. Repeat this thrice daily during one week. Feed on grain, and allow liberty out of doors during the day-time only when the weather is fair and dry.

(d.) *Prurigo*.—Subscriber, Adrian, Ill.:

A two-year old filly commenced rubbing on different parts of her body, and broke out in little pimples, which we call flea-bites, the principal breaking-out being on the neck, breast, shoulders, hind-legs, as well as front ones, and along one side of body.

The use of the curry-comb not proper, but cleanliness should be attended to by daily use of a brush. The animal should be fed sparingly, and after a day's feeding with soft feed or mashes, give a laxative compound of four drams of aloes, one dram of calomel, and two drams of ginger, made into a ball with soft soap. Such a ball may be repeated after ten days, after a day's feeding on wet feed. External applications not required. A teaspoonful of Fowler's solution of arsenic may be given morning and evening during fourteen days, or during every alternate week, so long as may seem necessary. It may be mixed in a handful of ground feed and laid before the animal, which will readily eat this, as the solution has scarcely any taste or smell. But the latter should be kept under lock and key, to avoid serious mistakes in the household, and should be provided with a poison-label, on which should be written: "This is for a horse."

(e.) *Melanosis*.—Subscriber, Durand, Wis.:

I have a horse, five years old, whose hind-parts, both outside and inside of thighs, are covered with hard lumps or kernels from the size of a pea to as large as half a walnut. They seem to be very tender and sore when touched. Sheath is swelled and sore, though it does not get very foul, as it is kept clean. He eats well, and is in good flesh and spirits.

Very likely these tumors are due to a state of melanomiasis, a disease in which there are dark, soot-colored tubercles under the integuments and in the viscera. These tumors are also sometimes called black cancer. This disease is most frequently met with in horses of a light color, such as white, gray, yellow, or dun, fawn, roan, speckled, etc. Externally, the tumors mostly manifest themselves about the anus, the tail, and the genitals of both sexes. When some of these tumors become so large as to interfere with the natural functions of these external parts or organs,

they may be removed by dissection; but others soon take their place. Both external and internal treatment of this disease is very unsatisfactory, and generally may be regarded as useless.

(f.) *Lousiness*.—Use the curry-comb and brush daily, and gather in a pail or other receptacle the hairs, dirt, and vermin thus removed. All that has been removed from the animals should be thrown on a fire. After each day's grooming, moisten the coat of the animals with a stiff brush dipped in weak vinegar. It is not necessary to make them soaking wet. Also, thoroughly clean out the stall at least twice a week, and burn all bedding, etc., thus removed. Give the floor, siding, and other wood-work a coat of white-wash. Keep lousy poultry away from the stable, because these, as well as lousy poultry-houses adjoining a stable, are a continual source of annoyance to stock.

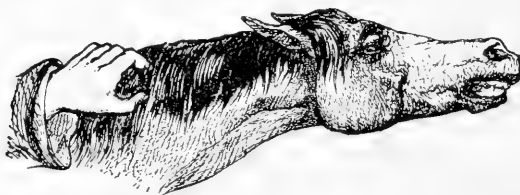
Or apply once a day, by means of a stiff brush, a sufficiency of a solution composed of two drams of borax in twenty ounces of hot water, to which add, when cold, fourteen ounces of acetic acid.

If this does not destroy the lice, an oil or an ointment containing some active ingredient is the only suitable application, and even this ought to be used in as small a quantity as possible, and to be extended over a maximum surface by plentiful rubbing. A good application may be made of one part of strong mercurial ointment and five parts of hog's lard, well rubbed together; and the animal, for some time after being rubbed with it, must be kept from exposure to rain or cold.

(g.) *Mange*.—Mange is an eruptive affection of the skin of animals, strictly similar, in both nature and symptoms, to itch in man. It presents some distinctive characteristics in our domestic animals; yet it possesses one pervading virus of the nature of itch, and can be communicated from one species of domestic animal to another. It bears the

name of scab in sheep, but maintains the name of mange in most other quadrupeds. It is, in all cases, both a loathsome and a discreditable disease. It seems generally, or always, to arise from the attacks of *acri*; yet it is often accompanied, and seems at least aggravated by the disgusting prevalence of lice. It is exceedingly contagious, passing readily from an infected animal to an uninfected one, whether the latter be strong or feeble, well or ill.

Mange in horses occurs chiefly among the ill-fed and ill-kept, and occasionally among the overfed and highly kept. Its principal causes, apart from direct contagion, are want of cleanliness, bad diet, bad ventilation, insuffi-



Test for Mange.

cient grooming, emaciated condition, and sudden changes of temperature. Any horse may acquire it by contact with an infected one, or by rubbing himself against a stall in which a mangy horse has recently stood, etc.; but a healthy, strong, properly kept horse often resists even direct contagion. A mangy horse may be readily detected by his rubbing and biting himself so as to remove small portions of his hair; yet a healthy horse who is slowly contracting the disease may not be suspected during its earlier stages, and a horse who is affected merely with some cutaneous disorders arising from derangement of the digestive organs may be mistakingly pronounced mangy. Mange usually begins about the tail and the mane; it soon causes a scurfiness and purulence about the roots and bulbs of the long hairs; and eventually spreads to other parts of the body,

and detaches the hairy coat from patches of the neck, the shoulders, the crupper, and the loins.

When a mangy horse has had a filthy stable, bad diet, and improper keeping, he must undergo a prompt and total change of regimen, and henceforth enjoy the necessities of cleanliness, ventilation, good food, and good treatment; and when a mangy horse is emaciated, or otherwise constitutionally enfeebled, he must receive tonic and alteratives, such as gentian, sulphur, and antimony, and a varied supply of generous diet. Every mangy horse, whether strong or feeble, underfed or overfed, must either be well washed with soft soap and water and rubbed with some special liniment, or freely sponged with some medicated liquid which shall serve the purpose of both wash and liniment. Among the good liniments may be mentioned a mixture of diluted creosote or carbolic acid and oil of tar; and among the lotions may be mentioned one consisting of, say two ounces of white hellebore, two ounces of tobacco, one pint of strong, fresh-made lime-water, and three pints of soft water; the hellebore and the tobacco boiled in the water till it evaporates down to a quart, and the lime-water added after the other has cooled.

IV. Wounds, Abscesses, and Tumors.—(a.) *Lacerated Wound (Barb-wire Injury).*—Keep the animal in-doors, preferably in a roomy box-stall or shed, where he can go loose. The wound should be cleaned several times daily with soft sponge and warm water, but no soap, and after cleansing apply with a soft feather to the crevices and the surface of the wound a sufficiency of a mixture of, say four ounces each of tincture of myrrh and tincture of aloes and one dram of carbolic acid. When taken in hand just after the accident has occurred, cold water should be applied continuously until bleeding ceases, and without touching or rubbing the wound. Thereafter, ragged edges

and shreds of tissue should be clipped off, and the hair should be cut short close to the wound and all around it. Stitching and bandaging are rarely necessary, but if necessary it should be done by a physician, in the absence of a good veterinarian. Perfect rest for some time is essential, as well as grain-feeding.

(b.) *A Bruise*.—A soft swelling is likely to be the result of a bruise. The horse may have run against some



Cleansing a Wound.

object, or may have been kicked by another horse. The swelling being soft and fluctuating, the contents are likely to be blood-water, or serum, which may be evacuated by making an incision through the skin. First clip the hair short over the extent of the swelling, then with a sharp-pointed knife make a bold incision through the skin, inserting the knife about midway in the swelling, and cutting downward to the lowest part of the swelling. Insert one or two fingers and remove all loose débris; cleanse with warm water, and when bleeding has ceased apply a sufficiency of a liniment made of equal parts of tincture of myrrh, tincture of aloes, tincture of asafetida, and oil of turpentine, mixed well together. This may be applied with a long-webbed feather two or three times daily. Cleanliness of the parts should be attended to morning and evening. Bandaging not necessary, but the animal should not be exposed to cold.

(c.) *Indurated Swelling*.—Clip the hair short over the extent of the swelling, and apply once a day, for such length of time as may seem necessary, a sufficiency of a mixture composed of one dram of oxide of mercury and eight ounces each of glycerine and spirits of wine. Provide ample bedding, and do not allow the animal to lie down on a hard and uneven floor.

(d.) *A Callus*.—Hair is not likely ever to entirely cover such scars, on account of absence of hair-bulbs or roots, and the callosity may not be entirely reduced by treatment. A small portion of an ointment made of half a dram of iodine mixed with two ounces of mercurial ointment may be applied once daily for a month or two. In season, give liberty on pasturage.

(e.) *Chafing*.—The skin about the neck and shoulders is, in some horses, very thin and sensitive, and during the summer months, when such animals perspire freely, the friction of the harness is apt to cause chafing, and sometimes local inflammation of a troublesome nature. Whether this can be entirely prevented depends much on the condition of the harness and on how it fits the horse. An ill-fitting harness or collar will chafe or gall any horse, and any harness will do so when sweat and dirt are allowed to dry into the harness, which by degrees becomes brittle, hard, and unyielding. All harness should be oiled at regular intervals, and it should be sponged free from dirt and sweat every time it is taken off a sweating horse; and so far as the horse is concerned, all parts of him on which the harness rests or bears should likewise be sponged off with clean water before he is returned to the stall, or before the sweat gets dry on him. After this is done, such places as have become chafed by the collar, breast-plate, saddle, belly-strap, crupper, or any other part of the harness, may, every evening after the horse has been grazed, be bathed with a lotion made of one ounce of Goulard's extract and a pint of soft water. If any particular place on the horse is especially subject to chafing, the corresponding part of the harness may be prevented from bearing on the place by means of properly arranged light padding, which padding should be cleaned and aired after each day's use.

(f.) *An Old Sore*.—It will be necessary to disintegrate the protruding raw surface, which is most effectually done by the application of a hot iron, and which is best done at the blacksmith's shop. The horse should be properly secured and a twitch applied to his nose, so as to keep him quiet. A half-inch or three-quarter-inch rod of iron should be heated to a glowing heat, and in applying it it should be gently moved against the surface of the wound, carefully touching the whole surface, and continuing until it becomes evident from the changed aspect that it has been thoroughly burned down to a level with the surrounding skin. Great pains must be taken not to touch the surrounding skin, consequently it is best to wind some wet rags round the leg immediately above and below the sore. After firing, apply a liberal packing of loose tow or oakum, which should be dry, and secure it to the wounded surface by a linen bandage, so applied as to produce a pressure. It should, however, not be tied so tight as to obstruct circulation of blood in the limb; but a firm pressure upon the burned surface is wanted. This bandage should remain on for twenty-four hours, when it should be removed and the wound washed with warm soap-suds. Thereafter apply a portion of a mixture composed of, say six ounces each of tincture of myrrh and tincture of aloes, in which is dissolved two ounces of sulphate of copper. Apply over this a dry tow or oakum pressure by means of a linen bandage, being careful to secure it in such a manner as to produce an even and firm pressure on the wound. Clean the parts and dress in this manner morning and evening. If, in spite of the compression, a luxurious sprouting, or so-called proud-flesh, appears, which generally bleeds freely on being touched, the whole surface may be touched once with lunar caustic, and the dressing continued as before. The healing of such indolent sores always results in a hairless scar, for which there is no remedy.

(g.) *Abscess*.—The term “abscess” applies to a collection of pus or of other matter in a limited cavity under an animal’s skin. It is the result of a morbid process, and may be induced by either an external cause, such as a bruise or the insertion of a nail or thorn, or by some internal cause, such as peculiarity of constitution or impurity of blood. It differs from an ulcer in this, that in the latter the pus is formed from an exposed surface. While the abscess is forming, the skin is usually very tender, the whole system is sometimes in a state of considerable irritation, and the part immediately affected is always the seat of pain, swelling, and an unusual degree of heat. A watery or dropsical swelling, on being pressed, retains for some time the marks of the fingers; a windy swelling is even more yielding than the watery tumor; but a true abscess, though also in some degree elastic or impressible, resumes its former shape the instant the pressure is removed. Any abscess is bad in nearly the proportion of its hardness, redness, and power of resisting pressure. If an abscess, in its earlier stages, be yielding and well supplied with fluid, it soon softens and points, diminishes in pain, and approaches a state of maturity. At the time of the “pointing” of the abscess, the matter in it can be felt more distinctly at one particular part than in any other part, and a tendency appears at this particular part to burst and to let out some or all of the collected matter. The bursting, however, should not be permitted; but at this stage the abscess should be opened at the lowest part, or that which would admit most readily of its discharging itself. The opening should be large, and no dressing will be required, except a continuance of the fomentation which should previously be used. It should be observed that if the abscess is languid and slow in forming, a stimulant, such as harts-horn liniment, rubbed in occasionally will be useful. The

wound ought to be kept quite clean; the edges of it ought to be trimmed of their hair or wool; a bran poultice may be applied as a substitute for bathing; and, if the wound be very slow in healing, a liniment consisting of equal parts of sweet-oil and spirits of turpentine may be applied once or twice a day, and the animal may be indulged with an increased degree of nutritiousness in its food. The stuffing of the wound with tallow, tow, or other materials, as is often practiced, tends, at best, to retard the process of healing, and may possibly produce a far worse evil than that which it is intended to remove. When an abscess forms under a part of the skin which is thick and inelastic, or in any part which will not readily distend so as to accommodate itself to the collection of diseased matter, it is more likely than in ordinary cases to escape observation for a time, and is attended with much more pain, far more serious consequences to the animal. An abscess in the foot of an irritable horse, for example, is sometimes a cause of death; and abscesses in various other concealed and resisting parts of the body occasionally baffle even a skillful veterinarian by their intricate symptoms, and are not absolutely known to exist till the animals die of them and are dissected. Such exceedingly bad cases are, happily, not frequent; and when they do occur, they may reveal themselves by the animal's loss of appetite, his hot skin, his constipated bowels, his quick and hard pulse—or, in one word, by his suffering a fever for which no other cause can be discovered.

(*h.*) *Fistula*.—A fistula is a discharging orifice or canal, generally resulting from an abscess. It can rarely be treated successfully or permanently without being freely explored and laid open with a knife to the bottom. As a rule, incisions are to be made lengthwise with the body or limbs of the animal. When very deep-seated, setons made

of soft leather, cut into strips of sufficient length and about a quarter of an inch in width, may be inserted through the various canals, pushing the seton needle through the same and out through the skin below. Thus dependent openings are made for the escape of matter, and injections of medicine may be made twice or thrice daily, after first squeezing out the contents and cleansing the surrounding skin and hair from adherent matter. If the escaping pus is of a dirty color, mixed with small dark or black spots, and has a very fetid odor, similar to that of decaying teeth, the bony structure or cartilage is affected. In this case, lay the fistula open with a knife to the bottom, and scrape away all decayed and black-looking portions of bone, cartilage, or sinew, as there can be no cure of a fistula so long as such decay exists. When the bleeding occasioned by the operation has ceased,



Fistula of the Shoulder.

and the parts have been cleansed with a sponge and warm water, wads of loose tow or oakum, soaked with medicines, are to be placed in the cavity. Either of the following solutions may be used for dressing it: In each ounce of soft water dissolve one grain of chloride of zinc, or in each quart of water dissolve one ounce and a half of pure carbolic acid. When in the course of treatment unhealthy granulations, so-called proud-flesh, appear, apply a sufficiency of a solution of half a dram of chloride of zinc in six ounces of water; but apply only a few times. Feed the animal liberally, and give regular daily exercise; afterward liberty on pasturage. The withers are the

most usual seat of fistula, from bruise by the fore part of the saddle.

(i.) *Poll-evil* (*Chronic*).—If the swelling and running sore is located between the ears, immediately back of the



Poll-evil.

top of the head, where it joins the neck, it is without doubt poll-evil. When it discharges pus, there is no further necessity for poulticing. (See poulticing.) It will be best to enlarge the orifice by making a

deep incision with a sharp-pointed knife, in the direction from forward back, or lengthwise with the neck, not crosswise, and cut away all diseased surfaces, scraping off decayed portions of bone, if such are found; thereafter, when bleeding has ceased, renovate the parts with warm water, and insert loose tow or oakum soaked with a solution of half a dram of chloride of zinc to each pint of soft water. The horse should go loose in a roomy box-stall or comfortable shed, and not be tied by a halter to anything. The dressing should be repeated twice or thrice daily.

(j.) *Tumors*.—A tumor may disappear in the course of time without any treatment, provided that no pressure from harness or saddle is brought to bear on it. Otherwise, by clipping the hair short and blistering it a few times, absorption may cause its disappearance, and in a shorter time. No "pipe" is forming in a tumor before it has discharged, or before an abscess has formed, and a tumor may not necessarily develop into abscess. A fistula, in which the so-called pipe exists, is the result of an abscess or sore from which matter is discharged; hence no pipe can form or exist in a tumor that has not yet discharged pus.

(k.) *Fibrous Tumors*.—[Any part of the animal, especially near a bone, may have them. Case 1 mentioned is in the lower front corner of the eye, between the haw and the lower lid. No. 2 is between the lower point of the shoulder and the neck, under where the collar pressed. No. 3 is on the limb, below knee or hock.—EDITOR.]

1. The proper course is to have the tumor removed by dissection; but on account of its location, great care is required, and some dexterity in the operator, who should be a skilled veterinarian. In removing the tumor, avoid injuring the so-called haw, which should not be taken away.

2. The only permanent cure consists in the removal of the tumor by excision or dissection. The person capable of doing this in a proper manner will also know how to direct after-treatment.

3. A fibrous tumor, and located on the lower portion of the limb, if dry or healed over with the normal substitute for skin, although it may be unsightly, is best left alone, unless, perchance, it is so shaped or located that its removal by dissection can be accomplished without risk or without causing a possibly greater blemish. Unless the tumor seriously interferes with the free movements of the limb, or with the movements of the other limb, it is best to leave it alone. It is not likely that such a tumor of so long standing could be reduced by any kind of medicinal application.

(l.) *Callous and Horny Tumors*.—The swelling is due to fibrous deposits and horny degeneration of the skin. These conditions being of several years' duration or existence, can not be altered or removed by any applications. In the location mentioned, from the hoof, where it is horny, to above the fetlock, where it is tumorous, it would not

materially interfere with the usefulness of the animal. Any irritating interference therewith may, instead of reducing the same, cause an increase thereof.

(m.) *Fungous Tumors*.—If the tumor has a narrow base, or in other words is pear-shaped, with the narrow part toward the body, then it may be removed by strangling it, which may be done by tying very tightly a shoemaker's or saddler's waxed thread around the base of the tumor and fastening with double knot. The application and tying must be done without pulling, and care should be taken that no part (if of the urinary organ) is included in the ligature. When, after two or three days, the tumor does not drop off, apply another ligature, still tighter and with the same care. The tumor will then be likely to soon drop off, when the wound may be touched twice daily with some bluestone. If, however, the tumor has no narrow base, it may be best to have it removed, partly by dissection, and with the aid of an *écraseur*. [This should be done by a veterinarian. Do not mistake a rupture for a tumor; constriction would be fatal.—EDITOR.]

(n.) *Fungous (Wart-like) Tumor*.—W. M., Iowa:

I have a young horse with a wart, or something of that kind, on his right fore-leg just below large part of shoulder. It is about the size of a hulled walnut. When the scab or outside is removed, it looks very red and angry.

Procure, say one dram of muriatic acid in a small glass-stoppered phial. Take a small piece of wood, about the size of an ordinary lead-pencil, flattened on one end. Secure the horse by applying a twitch on his nose. Then dip the flattened end of the stick in the muriatic acid, and, after removing the scab covering the tumor, apply by light strokes gradually over the whole surface of the tumor, carefully avoiding dripping any of the acid upon the skin or touching the surrounding healthy skin. Therefore only moisten the stick, dipping frequently in the bottle, and taking care of the fingers, the hand, and the clothes. When

the whole surface of the tumor exhibits a whitish film or coating, stop application and release the horse, but tie him for a few hours thereafter so that he can not reach the part with his mouth, which he will be likely to do unless prevented, immediately after application, and thus burn his mouth. It is best to apply the acid in the forenoon, so that the horse can be tied as usual in the afternoon. Apply thus only once every alternate or third day; and when the tumor has been reduced even with the skin, thereafter only apply daily a coat of tincture of iron or a strong alum solution.



A Warty Head.

(o.) *Synovial Tumors*.—In young animals, such enlargements are generally due to laxity or want of tone of ligaments or sheaths of tendons. Sometimes their reduction is accomplished by repeated mild blistering, and sometimes by rest and the use of specially adapted trusses obtained from dealers in sporting supplies. As the animals grow older and stronger, the tendency to such puffy tumors grows less and less. As a rule, these and kindred enlargements or tumors do not cause lameness, but in valuable animals they are unpleasant eye-sores, which are apt to return, especially after hard usage.



Bog-spavin (Synovial Tumor.)

To make an incision into a synovial tumor with a knife, to remove excessive accumulation of fluid, is apt to cause considerable local inflammation, and at best such removal of the contents is only a temporary relief. These enlargements about the hock-joint are of the same nature as the so-called windgalls, generally located above the fetlock. Treatment generally requires rest or freedom from work. But as these tumors generally are the result of severe exertion,

or hard work, or a want of tonicity in the parts, the tumors are apt to reappear on the recurrence of any such cause.

(*p.*) *Fluctuating Tumors.*—Fluctuation of a tumor is an indication that such tumor contains a fluid. It is not always an easy task, and it requires some experience and a certain dexterity and good judgment to not only decide whether a tumor is fluctuating, especially when a fluid is deeply located and only a small quantity is present, but also to decide what kind of fluid such tumor may contain. To ascertain whether a tumor is fluctuating, or, in other words, whether a perceptible motion can be communicated to pus or other fluid contents of a tumor by pressure or percussion, the animal, or the part of the body on which the tumor is located, must be so placed that the tumor becomes to some extent tense or stretched; then the first and middle fingers of one hand are placed on one side of the tumor, and the same fingers of the other hand on the opposite side, and by alternate but continued moderate pressure it may be decided by rising and falling of the sides or the central part of the tumor whether any fluid is contained within. When it is found impossible to decide to a certainty whether a tumor contains any fluid, which may be due to its being deeply located and in small quantity, its presence and location, as well as the nature of its contents, may be ascertained by a sufficiently deep insertion of a very fine trocar or by the aid of an aspirator needle.

Without such aid to diagnosis, it must be taken into consideration on what part of the body the tumor is located, what kind of tumor it is, and how long it has existed. When, for instance, a tumor is located at a joint, or about tendons and ligaments, and it is soft, not particularly warm or hot, and is easily fluctuating, it is almost certain to contain a synovial fluid, and, according to its

location, such tumor is named the thorough-pin, windgall, etc. When a more or less large tumor, which is not warmer than the neighboring parts of the body, is located on the abdomen, causing the animal little or no pain, it is certain to be a hernia, or so-called rupture, the contents of which may be either a portion of the intestine or the omentum, although in female animals it may be a portion of the womb. The synovial tumors, as well as the rupture, may have existed for some time, or they may be of very recent origin, either of which may be known by their condition, and especially thereby that when of very recent origin there remain yet some signs of irritation or inflammation, such as pain by manipulation and increased heat, besides more or less swelling of the immediate neighborhood, which signs gradually disappear, while the tumor remains.

(g.) *Exostosis*.—F. H. T., Lake Preston, S. Dak.:

A four-year-old mare has a bunch about the size of a hickory-nut, and hard, on inside of leg, half-way between knee and hock-joint. She has never worked nor been driven on road. If you advise blistering, what shall I use as a blister, and how often ought blister to be applied, and length of time to continue same?

The described bony tumor may owe its origin to some accidental injury, such as a blow or a kick; but whatever its origin, this kind of tumor had better be let alone when once it has attained the hardness of bone. During its early development, when the exudated mass is yet cartilaginous, local applications, with a view of promoting absorption, are often serviceable. Among such early applications may be mentioned frequently applied smooth and gentle friction, or continued moderate pressure by aid of bandaging. Blisters are not to be recommended in the early stage, or while heat and tenderness exist, because they are then apt to cause an increase of bony deposit instead of reduction. Later on, blisters may cause a partial (rarely an entire) reduction of the enlargement; but the process is very slow, tedious, and often disappointing in results. Repeated use of moderate blisters is preferable

to strong blistering or firing, which latter are apt to leave the additional blemishes of scars and permanent loss of hair.

A blister that may be especially recommended consists, by weight, of one part of biniodide of mercury and twelve parts of hog's lard. After clipping the hair covering the tumor very short, rub little by little of the ointment into the skin by smart friction with the finger-nails until a proper coat of the ointment has been applied. This had better be done in the morning, for the mare should be kept tied so short during six to eight hours thereafter that she can not reach the blistered place with her mouth. The tail should also be tied up, as we understand the tumor to be located on a hind-leg. After eight hours, the mare may be tied as usual, or go loose. The next morning apply another coat of the blister, but without much friction, and it is not now necessary to tie the animal up, as she will not touch the place. The next day, and once daily thereafter, apply to the blistered surface a coat of hog's lard. This should be continued without interfering or attempting to remove the crust formed on the blistered surface. This crust will fall off by degrees during a fortnight, after which continue a daily coat of sweet-oil or lard during a week. A repetition of the blistering, etc., may be repeated when the skin is again smooth and free from crust or raw places, and when the hair reappears. This blistering, with the precautions above stated, may be repeated three to five times. When after the third or fourth of such repetitions no material reduction in the size of the tumor should be apparent, it is useless to continue treatment.

V. Rheumatism, Founder, Paralysis, Etc.—

(a.) *Rheumatism.* — Rheumatism is very common in horses, and it arises from exposure to cold and rain, especially after being heated with exercise, or from washing with cold water while the animal is heated or perspiring, and, in general, from most of the causes which induce catarrh and influenza. It often attacks young horses which are severely worked, and old ones that have lived a life of

coarse treatment and hard labor. It is sometimes indicated by swelling and perceptible tenderness; but, in general, it shows itself by mere lameness, accompanied always with expression of acute pain, and sometimes with a considerable degree of feverishness. Whenever lameness, after a careful examination, can not be accounted for, or is found to go off after exercise and to return again, it may pretty certainly be pronounced rheumatism. It is in all cases distressing, in many obstinate, in some a kind of torturing palsy, and in most capable of great alleviation, and even of a real and permanent cure. The remedies for it are change of diet, diuretic medicines, stimulating applications, and somewhat warm and uniform temperature.

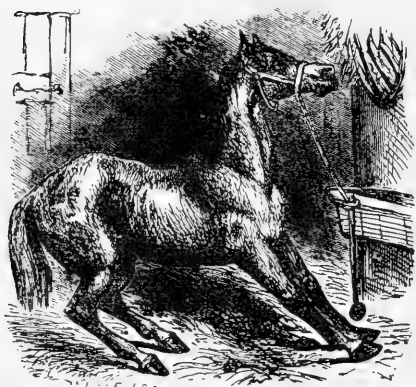
Apply thrice daily to where the lameness may be located, with smart friction, a sufficiency of a liniment composed of equal parts of oil of turpentine, tincture of cantharides, and spirits of camphor. Give bran-mashes and other soft feed, and blood-warm water to drink. Keep constantly within reach of the horse a large lump of brown rock-salt.

The animal should be kept comfortably housed, preferably in a roomy box-stall or shed, well ventilated, and free from draft of cold air; let the food be of a rather loosening kind, easy of digestion, and keep common salt constantly within reach in a separate small trough, not mixed among the food. During very cold, stormy, or wet weather, keep him in-doors, the body blanketed and the legs bandaged. Attend to regular daily grooming, to keep the pores of the skin open, and when the weather is mild, allow liberty out-doors or give gentle exercise. If the animal is not much used, it is best to have the shoes removed. It is likely that the blindness is due to the rheumatic diathesis.

(b.) *Founder*.—This disease consists in inflammation of the laminæ and of the vascular parts of the sensible foot.

It sometimes attacks only one foot, sometimes two, and sometimes all four; but in a great majority of cases it attacks either one or both of the front feet. A chronic form sometimes occurs, and exhibits symptoms somewhat similar to those of contraction of the hoof; but acute inflammation of the laminae is what is generally called the founder.

This disease is occasioned by overstraining of the laminae from long standing, by prolonged or excessive driving over hard roads, by congestion from long confinement, by sudden reaction from standing in snow after being heated, or from covering with warm bedding after prolonged exposure to cold, by sudden



Acute Laminitis, Founder, Fever in the Feet.

change of diet from a comparatively cool to a comparatively heating kind of food, and by translation of inflammatory action from some other part of the body, particularly after influenza.

In the early stages of founder, a horse evinces great pain, shows excessive restlessness of foot, and tries to lighten the pressure of his body on the diseased feet. In the more advanced stages, he is feverish, breathes hard, has violent throbbing in the arteries of the fetlock, lies down, stretches out his legs, and sometimes gazes wistfully upon the seat of the disease; and in the ulterior stages, if no efficacious remedies have been applied, the

diseased feet either naturally recover their healthy condition or they suppurate, slough, cast part or all of the hoof, and gradually acquire a small, weak, new hoof, or they undergo such mortification and change of tissues as to render the animal permanently useless.

The shoe of a foundered foot must be removed; the hoof should be pared in such a manner that the sole and central portion of the same alone sustain the weight of the body. Therefore, the wall of the hoof, or that portion of the hoof which under normal conditions is made to bear upon the shoe, should be pared or rasped away, all around, to such an extent that it does not touch the ground when the animal stands upon the foot. A well-bedded shed, or a roomy, well-bedded box-stall, should be provided, with a view of allowing ample room for stretching out, as well as for changing position, on a floor which should not be slanting, and which conveniences can not be had in a single stall, or when the animal is kept tied up in a confined space. Fomentations, evaporating lotions, wet cloths, and moist poultices should be applied to the feet. The animal ought to have light and spare diet and bran-mashes. When much fever exists, febrifuges and diuretics should be given. [See recipes.—EDITOR.]

(c.) *Colt Founder*.—Founder after foaling is generally more troublesome and dangerous than if occurring in its ordinary forms. The treatment should, from the beginning, be like that adopted in ordinary cases of founder, but more energetic, both locally and internally. Laxative and sedative remedies should be given internally, and poultices applied to the fore-feet after removing the shoes, and the edge of the hoof pared well down, leaving the sole and frog intact, that the whole weight of the animal may come upon these parts. Among the derivative measures, not the least effective is allowing the colt to suck; or, if the colt is dead,

to strip the udder clear several times daily. In some cases with acute inflammation and high fever, no milk is secreted; nevertheless the sucking should not be left untried. The return of milk generally indicates a successful issue. Colt founder is sometimes complicated with inflammation of the womb or other excitant malady; ascertain this and treat accordingly. Among the causes of colt founder is a plethoric condition, resulting from improper diet, want of proper exercise, etc., during the last months of pregnancy. Mares subjected to moderate work and light, nutritious diet are seldom affected, while those kept idle and largely fed on grain are more commonly affected. In some instances, breeders give brood-mares large and nutritious mash, intending to induce a large flow of milk. When such diet is combined with total inactivity, as is commonly done with a mistaken view of avoiding abortion, plethora is readily induced, and this tends to develop local inflammations, and among these the so-called colt founder.

(d.) *Azoturia*.—T. E., Eyota, Minn.:

A mare belonging to a neighbor; found her lying down in the stall suffering with spasms, but not like a case of colic or inflammation of the bowels; the bladder full of urine; a quality of very black urine, thick as molasses, was withdrawn by means of a catheter. Attempts were made to get her upon her feet, but found her hinder quarters paralyzed; bowels did not act; died after forty-eight hours.

The ailment from which the mare died was most likely azoturia, also sometimes called spinal meningitis. On the appearance of this disease the animal should be placed in a roomy, dry shed, free from drafts of cold air; plenty of short straw and chaff should be provided for bedding, which should be frequently adjusted and renewed, and kept dry by constantly removing all that becomes damp or wet. When unable to rise, the horse should be turned over every four hours, or oftener, if it becomes uneasy. If shod, the shoes should all be removed, to prevent injuring himself during convulsive struggles, and for the same reason plenty

of bedding should be kept under the head, and he should not lie too close to any wall or object against which he could injure himself.

The main object in the treatment of this disease is to keep the excretory organs active. Therefore the first thing to do is to give a purgative dose of medicine, such as six drams of aloes dissolved in a pint of boiling-hot water, to which solution add one dram of podophylline, two drams of saltpetre, and one dram of powdered capsicum. From two quarts to a gallon of blood-warm soap-suds should be injected per rectum every hour until purgation commences. Give steamed or cooked feed, cold or warm, as the horse may prefer; and as the patient generally is thirsty, he may be allowed to drink quite freely, especially of flaxseed-tea. Success has followed the use of a mixture composed of one grain of atropia, ten drops of diluted sulphuric acid, and six ounces of distilled water. Forty drops of this may be given every four hours. When tremors and convulsions exist, give every two hours a dram of bromide of potassium in a gill of cold water.

Generally the urine is retained, which causes considerable uneasiness and pain; wherefore it should be withdrawn, by the use of a sufficiently long, flexible catheter, about every fourth to sixth hour. If the horse on the second or third day should seem depressed, give every three hours an ounce of sweet spirits of nitre and two drams each of tincture of ginger and tincture of nux vomica. Attempts should also be made about the third or fourth day to get the horse to stand on his legs; but as he may not be able to support himself on account of weakness or numbness, and may soon fall and injure himself by awkward attempts at standing or rising, a sufficiently strong and comfortable sling should be used. Most of these patients are at first disinclined to stand, but after being supported sufficiently, while the limbs are being briskly hand-rubbed, they soon regain strength enough to support themselves by aid of the sling.

In this disease, neither blisters, stimulants, nor fomentations should be resorted to, as they do harm by exciting the animal, and increase its struggles. In cases of complete paralysis of the hinder parts, treatment generally proves useless. Perfect recovery from this disease is often

slow. Most success attends treatment when instituted at the very beginning of the disease, which often runs its course very rapidly to a fatal termination. Much noise should be avoided, and the animal should be carefully watched and attended to by trusty men during the night as well as during the day. This disease has for a long time been very little understood; hence often most wrongfully, and as frequently most barbarously, treated, and consequently great fatality has been the general result.

(e.) *Paralysis, or Palsy*.—By this we understand a condition in which there is loss of muscular power from the arrest of nervous influence, and in which the muscles themselves continue unimpaired, but wholly or partially cease to be strung and moved by the nervous energy. The paralysis of the whole system, or what is generally called palsy, seems never to occur in the horse; and the paralysis of the whole of one side, or what is called hemiplegia, seems to be comparatively rare; but the paralysis of both sides of the hinder extremity, or what is called paraplegia, is somewhat frequent, and occasionally very stubborn and severe. When hemiplegia occurs, it is comparatively mild; but, if not cured, it usually passes into paraplegia. A palsy-struck horse is commonly affected first in one or both hind-legs, walks on his fetlocks, is scarcely able to move forward, staggers at every step, and eventually falls. His disease is essentially inflammatory, and may generally be traced to a fall, to overworking, to exposure to cold and wet while covered with perspiration, to some injury in the head, or to the effects or mismanagement of staggers. The remedies are blistering or mustard-poulticing, warm clothing, mash diet, frequent injections, and the administration of sedatives or tonics, according to circumstances and the cause or causes. A numbness of the limbs sometimes arises from ordinary prolonged exposure to cold, wet weather; but this must not be confounded with palsy, and

needs no special treatment; but it will soon go off in the stable or other comparatively snug situation. Paralysis of the sphincter muscle, or neck of the bladder, is sometimes induced by riding a horse hard and not giving him time to stale; and this causes a constant dribbling of the urine, and is often styled, with reference to the mere effect to the exclusion of reference to the cause, incontinence of urine.

(f.) *Partial Paralysis*.—J. K. C., Luverne, Minn.:

A mare that when she lies down can not get up without help. She raises her fore-legs, but can not raise. When she walks she has not perfect control over her hind-limbs.

The animal should be kept in a cool shed, provided with plenty of bedding, and she should not be tied. She should have oats and corn ground together, and plenty of fresh-cut grass. A stimulating liniment of ammonia should be applied over the loins, twice or thrice daily, composed of one part of aqua ammonia mixed with three parts of cotton-seed oil. Internally, give morning and evening one of the following powders: Take six grains of strychnine, three ounces of ginger, and six ounces of gentian-root. Mix carefully and intimately together, and divide into twelve powders. The powder may be given with molasses enough to make a paste, which apply upon the root of the tongue when there is no food in the mouth.

(g.) *Epilepsy*.—F. T. M., Maquoketa, Iowa:

A mare fourteen years old. She was taken with a kind of weaving or staggering of the hind-parts while walking, and while standing would fall at times as if struck in the head with an ax, and immediately get up again. She has a good appetite, and at times will seem perfectly well.

The probability is the mare is subject to epileptic fits. Epilepsy generally depends upon some abnormal state of the brain, caused either by debility, plethora, constipation, or intestinal worms, etc. The first attack, when energetically treated, often prevents a recurrence of the evil; but in cases of long standing, treatment often proves unsatisfactory. Frequent changes in feeding, and the moderate use of stimulants, often prove serviceable. Tonic reme-

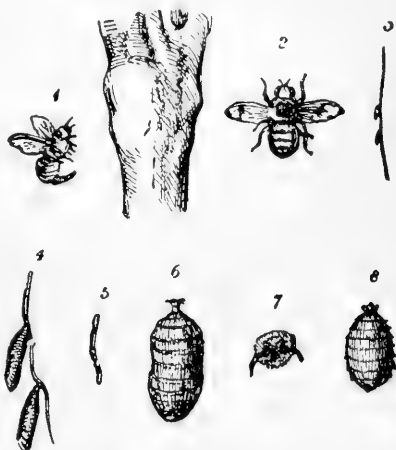
dies, also, are used to eradicate the disease, such as oxide of zinc, nitrate of silver, sulphate of iron, phosphorus, gentian, etc. To nourish and stimulate the faulty structures, it has been proposed to administer phosphorus, in the form of an ethereal tincture, which is made by macerating, say four grains of phosphorus with an ounce of sulphuric ether. The dose of this tincture is fifteen drops three times a day, and given during a week. Next week, give morning and evening, each time, a dram and a half of powdered sulphate of iron, united with three drams each of powdered gentian and ginger. On the third week, give the tincture as before, and so on during weeks alternately until all symptoms of the ailment disappear. Give loosening food twice or thrice weekly.

VI. Some Internal Diseases.—(a.) Bots in Horses.

—Botflies, or gadflies, constitute a tribe of dipterous insects well known to farmers for the annoyance which several of their species give to sheep, cattle, and horses. The perfect insects are short-lived, and not often seen, and the larvæ spend most of their existence under the skin, within the stomach, or otherwise in the interior of ruminating animals. Yet the whole tribe, in all the stages of existence, is remarkable for extraordinary habits, nice mechanical adjustments, and a general character of wondrous instinct and beautiful organization. Two genera particularly come under our notice, namely, *Gasterophilus* and *Œstrus*.

The great spotted horse-bot, *Gasterophilus equi*, is one of the largest, and by far the most common, not only of the genus, but of the tribe. Its length is about seven lines; its general color is clear yellowish-brown; its head is broad and obtuse; its thorax has a somewhat grayish color; its abdomen is rusty-brown, with a tinge of yellow and a series of dorsal spots, and its wings are whitish, with a black undulated transverse fascia behind the middle. The female, in a series of sudden descents or dartings,

deposits her eggs upon the hair of some part of the horse, within reach of his mouth, making them instantly adhere by means of a glutinous secretion which she gives out along with them, and sometimes depositing upon a single horse as many as four or five hundred eggs. Each egg is somewhat conical in shape, the attached end forming the apex; and when seen through the magnifying-glass is shagreened on the surface with transverse and longitudinal striæ. The horse in licking himself takes up a considerable proportion of the eggs with his tongue; the eggs disclose their animated contents either while on the tongue or very speedily after passing into the stomach, and the larvæ immediately attach themselves to the stomach's inner tissue, and there remain in security from the



The *Cestrus Equi*. (From the Work on Bots, by Bracy Clark.)

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| 1. The female fly about to deposit an egg. | 5. The newly-hatched bot. |
| 2. The male fly. | 6. The bot full grown. |
| 3. The egg, its natural size. | 7. The head of a bot, magnified. |
| 4. The egg, magnified. | 8. The chrysalis. |

end of summer or beginning of autumn till late in spring, enjoying a temperature of about 102° Fahrenheit, suffering no injury from the action of the gastric juices, feeding upon the mucus or the chyme, and gradually, though slowly, growing to maturity of size. Each larva is shaped somewhat like a flask or elongated bag; it has a pale yellowish color; it possesses at the sides of its mouth two hooks, with which

it anchors itself to the stomach's membrane; and it is engirdled with several belts or rings of spinelets and projecting points, by means of which it regains its position when at any time it accidentally loses its hold. When it attains maturity, it disengages itself from its anchorage, is carried with the horse's food into the villous portion of the stomach, passes out with the same, and is evacuated with

the dung. The ejected maggot seeks a place of shelter, buries itself in the ground, and changes into a chrysalis; the insect in this latter form resembles the larva in shape, but is more rigid, and has a reddish-brown color. After lying for a few weeks inactive, it escapes by the narrow end of the pupa-case and assumes its final form of an imago, or a fly.



The *Estrus Hemorrhoidalis*.
(After Bracy Clark.)

1. The female fly about to deposit an egg.
2. The egg, magnified.
3. The bot.
4. The chrysalis.
5. The male fly.

to the horse by the above-described great common bot, and as to the desirableness of using strong medicinal means for destroying the insect; but all such opinions are very nearly without foundation. It is fortunate for the horse, or rather most beautifully ordained, that their numbers are much reduced, and kept within due limits, by the hazards they are exposed to in the singular round of their propagation. Some of the eggs, in the very act of their deposition, are shaken off by

Many strong opinions have been entertained as to excessive injuries done to the horse by the

the movements of the horse; some, though firmly deposited, are not taken up by the horse, or are externally hatched from the action of rain or other moisture, and in consequence perish; many are destroyed during the horse's process of mastication; many fail to make a lodgment in the stomach, but pass on to the intestines; and not a few of the matured larvæ are dropped in such situations as to be crushed by the horse's foot, picked up by birds, or are unable to find a suitable retreat for their transmutation into chrysalides. Altogether, we may calculate that one hundred or upward perish, in the state of either egg or larva, for every individual which attains the perfect condition of the fly.

(b.) *Intestinal Worms.*—The complete destruction of intestinal worms as they pass from our domestic animals would tend materially toward lessening their propagation, when we take into consideration that each female worm may contain hundreds of thousands of minute eggs, which do not become extinct because the maternal worm dies, but will pass into the state of embryogeny, sooner or later, under favorable conditions, as we have stated above. The only sure method of completely destroying the intestinal worms that have passed from our domestic animals, whether these worms are alive or dead, or when found in the bodies of dead animals, consists in burning them.

That an animal is infested with worms is known to a certainty only by their passing off with the excrement. When an animal under ordinary good care and good feeding remains in an unthrifty condition when not suffering from any disease, and even maintains a ravenous appetite, it may be assumed that intestinal parasites exist in large numbers. But treatment for worms should not be undertaken unless we are reasonably certain that worms are present. When worms are ascertained to be present, the

animal may be treated as follows: Mix together equal parts of powdered tansy, calamus-root, wormwood, and common salt. Of this, mix for a full-grown horse or ox two tablespoonfuls, once or twice daily during a week, among a few quarts of ground feed. Younger animals are given less in proportion to their age. The strength of the animal should be supported by regular rations of nutritive food. If found necessary, the treatment may be renewed after fourteen days.

Common salt is an article which we have often recom-



1. Lumbricus, not peculiar to horses. One-fourth natural size.



2. An Ascaridis, natural size.



3. A Strongylus, natural size.

mended. It prevents as well as remedies many disorders of the digestive organs, and in young stock it prevents the accumulation of worms in the intestinal canal. When not given free access to common salt at all times from colthood, horses are apt to partake too freely of the same, and the thirst thereby created causes them to drink so freely of water as to produce diarrhea. Salt the animal must have, and we have always advocated its continual presence where they could have access to it at all times, instead of mixing it among their food or giving it at certain or uncertain intervals, and perhaps in insufficient quantity. If common salt in grain or powdered condition is partaken of too greedily, lump-salt, or so-called rock-salt, should be procured. There should be a lump of stone-salt in every

manger or feeding-box on the farm, both for horses, cattle, and sheep. Of course, the animals should also at all times have access to good and clear drinking-water. [The illustrations show three forms of internal parasites; 1 is a common intestinal worm; 2 and 3 occupy the large intestines, 2 near the rectum; 3 sometimes cuts through important structures.—EDITOR.]

(c.) *Diarrhea*.—This affection, which consists in a relaxed condition of an animal's bowels, is sometimes a mere successful effort of the constitution to get rid of matter which would be injurious to health; sometimes it arises from a temporary or stimulated overaction of certain of the digestive organs; and in neither of these cases is it to be regarded as a disease. But in most instances it is truly morbid, and in some it is not a little dangerous. It differs from dysentery in being merely a relaxation, and not an inflammation, of the mucous membrane of the intestines; in having its seat principally in the small bowels, while dysentery has its seat principally in the large bowels; in causing a discharge more copious, very liquid, and without any glairy mucous matter; in causing, from its very commencement, a free or copious purging, and in being usually unaccompanied, in its early stages, with much fever or with any other considerable disturbance of the health. Dysentery, it may be inferred, therefore, is generally the more dangerous disease of the two. Diarrhea, regarded physiologically, is an acceleration of the peristaltic motion of the bowels, accompanied with increased secretion of fluid matter in the intestines, or with a morbid inaptitude in the absorbent vessels to take up the due proportion of liquid from the mass which passes into the intestines from the stomach.

Diarrhea in horses is not very frequent in occurrence, and seldom serious in character or difficult of cure. It is

occasioned variously by constitutional weakness in the bowels, by lightness and smallness in the organic structure of the belly, by the drastic effect of overpurging with medicine, by a suppression of perspiration, by imperfect assimilation of food, by great and sudden change of diet, by oversecretion of bile, and, in a less degree and more infrequently, by some other causes. When the disease is constitutional, it must be palliated by a gentle and constant antagonism upon its peculiar causes, whether in the form of moderating drink, moderating labor, or tonically strengthening the digestive organs. When it arises from any ordinary temporary cause, it may generally be cured by a change of diet and increase of warmth; and when it is either very violent or much prolonged, it must be subdued by means of astringents, first by the mouth, and then, if need be, by injections per rectum. The best astringents are powdered catechu, prepared opium, prepared chalk, and common alum; but the last of these ought not to be used in any but the very worst cases, and the others should be administered in some such emollient substance as thin boiled starch or arrow-root.

(*d.*) *Dysentery*.—This disease is very liable to be mistaken by ignorant or superficial observers for the far milder disease of diarrhea, but it is readily distinguishable from that disease as to both its nature and its symptoms; and as it is vastly more violent and frequently fatal, it ought to be easily recognized by everyone who has charge of any of the animals of a farm.

Dysentery in the horse occurs oftener in young animals than in older ones, and in robust than in feeble ones, and is most frequently occasioned by a sudden check of perspiration, a sudden and injudicious change in food, much exposure to cold and fatigue, pasturage on lowlands and marshes, the taking up of mineral poisons in food or drink,

and the excessive use of purgative or drastic medicines. It sometimes begins in diarrhea, but is more commonly an independent or primary disease; it consists in inflammation of the mucous membrane of the large intestines, attended with an increase and a morbid alteration of the mucous secretions, and with a general inflammatory and febrile action. The fæcal discharges from it are frequent, slimy, fetid, and of greasy appearance. When the disease becomes exceedingly virulent and aggravates itself into ulceration of the intestines, the discharges from the bowels contain blood and leathery-looking pieces of coagulated lymph. The affected animal has dry mouth, heaving flanks, hot ears, great thirst, no appetite, much pain, and constant irritation and restiveness of the rectum. Treatment consists in the use of a saline aperient, such as sulphate of soda or sulphate of magnesia, in doses of from four to eight ounces, repeated twice daily, and injections per rectum several times daily of warm flaxseed-tea or slippery-elm tea, besides feeding with gruel or similar sloppy food. Calomel and opium, of each one scruple, given thrice daily for one or two days, have been attended with much benefit. When the severe inflammatory symptoms have subsided, styptic and stimulating remedies, which act topically on the mucous membrane, can be used, such as acetate of zinc, acetate of lead, and turpentine; all given in small doses, rather frequently, and mixed with large quantities of thin gruel or decoction of flaxseed.

(e.) *Symptomatic Fever*.—Symptomatic fever is the attendant of inflammation in some particular part of the body, and, conjointly with the primary disease, is always more violent and dangerous than idiopathic fever; and though it requires, in very bad or peculiar cases, to be treated as if it were itself the primary disease, or nearly in the same manner as idiopathic fever, yet it ought

generally to be viewed as a mere symptom, and will be found to subside simultaneously with the reduction of the disease which excites it. The chief thing connected with it is to mark the special varieties of its indications, as means of ascertaining the precise seat and modification of inflammation which causes it, and therefore as indices of the special varieties of treatment to be pursued. When the inflammation arises from excessive and prolonged exertion, the symptomatic fever is suddenly developed, and early exhibits a violent character; but when the inflammation arises otherwise, the symptomatic fever is gradually developed, and presents at first a mild appearance; and in any case it is not preceded by shivering. The principal symptoms common to it and idiopathic fever are loss of appetite, quick pulse, dejected look, hot mouth, and debility. If to these symptoms are joined difficulty of breathing and quick working of the flanks, with coldness of the legs and ears, we may conclude that an inflammation of the lungs is the cause of the fever. If the horse hangs down his head in the manger, or leans back upon his halter with a strong appearance of being drowsy, the eyes appearing watery and inflamed, it is possible that the fever depends upon an accumulation of blood in the vessels of the brain, and that the staggers are approaching. In this case, however, the pulse is not always quickened, but sometimes is unusually slow. When the symptoms of fever are joined with a yellowness of the membranes of the eyes and mouth, an inflammation of the liver is indicated. Should an inflammation of the bowels be the cause, the horse generally shows signs of griping. An inflammation of the kidneys will also produce fever, and is distinguished by a suppression of urine and an inability to bear pressure upon the loins. When inflammation of the bladder is the cause, the horse is frequently staling, voiding only very small quan-

tities of urine, and that with considerable pain. Extensive wounds, and particularly those of joints, will also produce symptomatic fever. Sometimes several of the internal parts are inflamed at the same instant, and, in fact, when inflammation has existed for a considerable length of time, it is seldom confined to the organ in which it originated; the disease spreads to other viscera, and when more than one organ is inflamed, the symptoms will generally be complicated. Still, however, the essential remedies are the same; that is to say, sedatives and blisters.

(*f.*) *Heaves*.—If the symptoms become aggravated every time the horse is subjected to a smart trot or short gallop, or when pulling a load on heavy road or up-hill, the case may be one of heaves. Among the symptoms usually evinced are a feeble, dry, hacking, or suppressed cough; abnormally expanded nostrils; breathing is accompanied with a peculiar jerking motion of the flanks; that is, the expulsion of air from the lungs is effected with a double movement of the abdominal muscles, after which the flanks suddenly fall down, and it takes a longer time to expel the air than to draw it in. There is a tendency to flatulency, or windy expansion of the abdomen, frequent passing of wind, especially when exercised in trot or gallop, etc.

This malady, besides often being a sequel to bronchial catarrh and other diseases of the respiratory organs, is, perhaps, more frequently caused by dietetic errors, such as continued feeding upon dry, coarse, and bulky material, as timothy and millet hay, or dry corn-stalks; also such and other hay when dusty, moldy, damp and partly decomposed. Other causes are overexertion on full stomach, and especially when such horses are habitually fat, kept a long time confined in idleness in the stable, and fed liberally on hay and other coarse and bulky food. Treatment with a

view to permanent cure is generally not successful. However, the ailment may be greatly ameliorated by a strict attention to the diet, which should be the reverse of that which has hitherto been given. Give nutritive food, of small bulk and of best quality, such as finely cut wild hay mixed with ground oats and corn, bran, and a small quantity of ground oil-cake or flaxseed-meal, all slightly wetted. In summer, green or succulent food instead of hay, and in winter, daily allowances of sliced carrots and other roots. Such horses should never be fed or watered immediately before use, and they should be used only for slow and easy work.

(g.) *Indigestion*.—A chronic form of indigestion, or a kind of dyspepsia, sometimes attacks horses, and greatly impairs their strength and reduces their condition. A horse affected by it either has little appetite or a very irregular one; he passes a large portion of the materials of his food in an unassimilated condition, or not in a very different one from that in which they were eaten; and in the advanced stages of his illness he has a dry and staring coat, and exhibits the peculiar appearance of being hide-bound. The immediate causes of these symptoms are some morbid change in the stomach, some imperfection in its secretions, or the presence in it of some improper and disturbing matter; and the originating cause may be a filthy, ill-ventilated stable, the use of musty hay or grain, the continued use of condition-powders and similar catch-penny nostrums, the heating of the body with too much clothing, the presence of intestinal worms, or any one or more of a hundred other unhealthy influences.

The cure, like that of dyspepsia in the human subject, is determined by the nature of the cause, and must be such as to bring the digestive system under a totally different set of influences from those which have accompanied the

disease. If worms be present, anthelmintics must be given; if the organic power of the stomach be diminished, tonics must be given; if good air, proper exercise, and sufficient grooming have been wanting, these requisites of health must be supplied; and, in any event, good restorative food, of a different kind from what the animal has been recently accustomed to, must be supplied—particularly succulent food in spring and abundance of nourishing food in autumn. [See anthelmintics and tonics.—EDITOR.]

Besides having a small supply of common salt constantly within reach of the animals, procure the following medicines: Take of powdered sulphate of iron, one dram; powdered gentian-root, two drams; arsenic, five grains; mix. Give one such powder among slightly moistened oats every evening during a week. Then after one week's intermission repeat as before for a week. Continue during three alternate weeks, if deemed necessary. If from the rectal appearance there may be so-called pin-worms in the posterior portion of the intestines, these may be destroyed or dispelled by occasional injections of tobacco decoction, the injections to be made soon after the horse has passed dung, and from one to two quarts injected at a time. Allow daily exercise.

(h.) *Hydro-thorax following Pleuro-pneumonia*.—Give twice a day for a week or ten days the following: One dram of powdered sulphate of iron and three drams each of powdered gentian-root and powdered or ground cinchona; mix this with a sufficiency of honey to make a doughy mass, which place upon the root of the tongue with a flattened stick of wood. If much distress or difficulty of breathing exists, it may be best to resort to tapping, which may be repeated. Feed liberally on oats, etc. Horses recovering from this affection often remain wind-broken more or less.

(i.) *Wind-broken*.—This malady, besides often being a sequel to catarrhal affections, is, perhaps, more frequently caused by dietetic errors, such as continued feeding upon dry, coarse, and bulky material, as timothy and millet hay, corn-stalks, overripe, dusty, moldy, or partly decomposed hay. Other causes are overexertion on full stomach, and especially when such animal is habitually fat, kept a long time confined in-doors or idle, and meanwhile fed liberally on coarse or bulky food. Treatment, with a view of permanent or complete cure, is generally not successful. However, the ailment may be very much ameliorated by a strict attention to the diet, which should be the reverse of that above stated. Give nutritive food of small bulk and best quality, such as finely cut wild hay mixed with ground oats and corn, bran, and a small quantity of crushed oil-cake or flaxseed-meal, all slightly wetted; besides this, in winter, daily allowances of sliced carrots and other roots; in summer, green or succulent food instead of hay. Such a horse should never be fed or watered immediately before use, and the usage should consist only in slow and easy work.

(j.) *Diabetes*.—Excessive secretion of urine is due to a variety of causes, among which is, especially, feeding on musty, mow-burnt hay and musty or spoiled grain; also continued use of condition-powders, many of which contain harmful ingredients or drugs. Faulty food should be discontinued or avoided, and instead give sound hay and grain, among each ration of which latter may be mixed a handful of ground flaxseed (not oil-cake); or, instead of the dry flaxseed, make flaxseed-tea, and water the horse always from a bucket containing half an ounce of flaxseed-tea and water. The flaxseed-tea need not be warm, but should be made fresh every day. By way of medication, give half a dram of iodide of potassium dissolved in a

little warm water, and mix this in the bucket of drinking-water above recommended. This may be repeated morning, noon, and night during every second or alternate week. Until recovery takes place and strength and condition is gained, the horse should not be used, but should have liberty for sufficient exercise at will, and be housed in wet or cold weather and during nights.

VII. Miscellaneous.—(a.) *The Pulse.*—In relation to this, Doctor Paaren says: The pulse may be felt in several places on the body, limbs, and head, both in man and animals. In man, it is most conveniently felt at the wrist, and in the horse on the branch of the carotid artery which passes under the jaw-bone just below its angle. It arises from the propulsion of the blood into the arteries by the contractions of the left ventricle of the heart, and it therefore indicates the strength of the contractions, the number of them in a minute, the regularity of their succession, and the general effect of them upon the circulation. Numerous distinctions with regard to the pulse are made by physicians, but the principal circumstances to be attended to in the case of the horse are, first, its frequency, or the number of pulsations in a minute, which in a healthy horse is about forty; next, its strength. When the contraction of the heart is strong, the pulse is felt distinctly though the artery be pressed moderately with the finger; but when weak, very little pressure will prevent its being felt. When the artery is too irritable and in strong action, it will contract quickly upon the blood it receives, and the impression or sensation conveyed by the finger will be short, or that which is expressed by hardness; when the swell of the artery is more slow or soft, it denotes the contrary state; thus there may be a frequent, or, as it is more commonly named, a quick pulse, a strong pulse, a weak pulse, and a hard pulse or a soft pulse. To this may be

added the irregular or intermitting pulse, which, of course, indicates an irregularity in the contractions of the heart, and sometimes happens when the horse does not labor under any serious disorder. Those who wish to attend to the diseases of horses should make themselves familiar with the state of the pulse both in health and disease, and they will learn from experience that it will enable them to judge better of the nature and probable event of a disease than any other single circumstance.

Sir F. Fitzwygram writes more particularly upon this subject, as follows:

The number of pulsations per minute in an adult healthy horse, the temperature of the air being about 60°, is from thirty-two to thirty-six. The pulse, however, in young subjects is generally quicker than in aged horses. It is also usually a few beats slower in low than in well-bred animals.

Although the above is the usual number of beats, yet the pulse may vary from twenty-six to forty beats in the minute, notwithstanding the horse may be apparently in good health.

The most convenient places for taking the pulse are the submaxillary, the radial, the temporal, the metatarsal, and the plantar arteries. [The neck vein, the artery under the jaw, the temple, and the vein of the foot are generally selected.—EDITOR.]

The slightest excitement, especially when the horse is sick, will cause an alteration in the pulse. To ascertain, therefore, the true character of the pulse, both with reference to tone and number, the animal should be approached very quietly, and should be soothed for a minute or two before the finger is applied to the artery.

The fore and middle fingers should be placed on the artery in a transverse direction. If it is placed obliquely,

the impression will be erroneous as to the true character of the beat.

A regular pulse, with proportionate fullness, is the best criterion of health. Irregularity usually arises from irritability or debility of the system.

A strong and full pulse is present during health under any temporary excitement; but this character is seldom found to accompany any morbid state into which the animal may fall. The full pulse, which often accompanies disease, has always some *vibratory hardness* in it.

The intermittent pulse.—A pulse is said to be intermittent when it beats two, three, or four times regularly, and then ceases for a period of time equal to two or three beats before it goes on again.

Irregularity in strength.—The pulse may beat with natural force two or three times in succession, and then the next beat or two may be feeble, and afterward it may become strong again, and so on.

Intermittent and irregular.—The pulse may be both intermittent as to time and also irregular as to tone.

The above changes indicate disease of the heart, either functional or structural, or both conjoined.

Strong and full, or soft and full.—These conditions, though somewhat abnormal, are yet quite consistent with ordinary, though not perhaps with perfect health.

Weak and small.—This condition is indicative of great debility, especially if the pulse is easily extinguished by pressure.

Quick, feeble, fluttering, or imperceptible.—This condition is indicative of speedy death.

The wiry pulse.—A hard, small pulse, as a wire is hard and small, indicates disease of a sthenic character, and is symptomatic especially of inflammation of the serous membranes and of white fibrous tissue.

The thready pulse.—A pulse which is small and soft, as a thread is small and soft, is termed thready. It indicates great debility.

The oppressed pulse.—The artery is full, but the beat is indistinct. It is indicative of congestion and inflammation of the lungs.

The throbbing pulse.—In the region of any part which is inflamed or congested, or unusually excited from any irritation, the artery will throb more or less violently. The character of the pulse in the vicinity of local disease will indicate its intensity, and in some degree its nature.

A remarkably slow pulse indicates disease or injury of the brain or spinal cord.

(b.) *Clyster.*—This adjunct to treatment of diseases is much and very usefully employed on the human subject; but though equally well adapted to the lower animals, it has been very generally neglected in the case of even horses and cattle. An aperient clyster, in all animals, is highly serviceable in the first stages of fever, or in inflammation of the bowels, or in an irritated state of the bowels, or in obstinate costiveness, or for assisting the action of internally administered purgatives; an anodyne clyster is serviceable in cases of great irritation of the lower intestines, of obstinate diarrhea, or of excessive purging from the internal administration of cathartics; a nutritive clyster is valuable in cases of epidemic catarrh, influenza, locked-jaw, convulsions, extreme debility accompanied with want of appetite; and a cathartic clyster is of use in cases where the lower intestines are obstructed and require to be speedily evacuated.

An aperient clyster for a horse may consist simply of a gallon of warm water, or of two ounces of common soap dissolved in a gallon of warm water, or of a pint of linseed-oil and nearly a gallon of warm water—though this

last is appropriate chiefly for the purpose of expelling the species of worms which infest the rectum; a cathartic clyster for a horse may consist of half a pound of common salt, or of Epsom salts, dissolved in a gallon of warm water, or of an ounce or an ounce and a half of aloes dissolved in two or three quarts of warm water; an anodyne clyster for a horse may consist of one and a half to two quarts of very fine gruel, or one and a half to two quarts of thin mucilage of starch or arrow-root, or of four ounces of finely powdered prepared chalk, well stirred into one and a half to two quarts of gruel, with the addition, in very bad cases, of two scruples or a dram of powdered opium; and a nutritive clyster for a horse ought never to consist of strong broths, or ales, or wines, or any other stimulating substances, but ought to consist only of thick gruel, and to be administered in quantities of not more than a quart at a time. Proper clysters for cattle are strictly analogous to those for horses.

The temperature of every clyster, at the moment of administering it, ought to be, as nearly as possible, 96° Fahrenheit. The principal art in administering a clyster consists in not frightening the animal. The pipe, well oiled, should be very gently introduced, and the fluid not too hastily thrown into the intestines.

(c.) *Parturition*.—Among the signs of approaching parturition in the mare are engorgement of the udder, with edematous or dropsical swelling forward along the abdomen, swelling and flabbiness of the external genital parts, the membrane of which is reddened, and more or less covered with a viscid, glairy slime; the croup and flanks are hollow. Shortly before the act, a certain uneasiness or restlessness is evinced, and when watched while she is feeding, she may be noticed to suddenly stop chewing and appear as if listening to some sound, and then

commence eating again. Some mares, when the time is close at hand, will show signs of colic, lying down and getting up at short intervals, and act as if in distress or pain, which may be looked upon as the labor-pains beginning. Phlegmatic mares are generally mute, and show less uneasiness, while others, while showing considerable distress, may also utter stifled cries. These premonitory signs may occur within two hours of foaling, or may last from eight to twelve hours before the act. It will thus be seen that a mare may show none of the more urgent signs of the near approach of foaling when last seen at ten or twelve o'clock at night, while she is just as likely to be foaling within two hours thereafter. The after-birth, if not parted with simultaneously with the foal, is generally expelled soon thereafter, and it is exceedingly rare that it is retained after twelve hours, during which time no attempt should be made to remove it by force, as a fatal hemorrhage might thus be provoked. We have not space here to describe the ailments to which new-born colts are liable. Diarrhea in all new-born animals very often terminates fatally. In the first place, the young animal should be kept warm and comfortable. Procure the following mixture: Decoction of marsh-mallow eight ounces, and tincture of opium one fluid dram. Of this give every two hours two tablespoonfuls.

(d.) *Edema Previous to Foaling*.—A. B., Houghton, Iowa:

I have a brood-mare which gave a sort of gluey substance instead of milk last spring, and her colt then died. She now has a swelling which some call milk farcy. I think you will call it local dropsy, or *anasarca*. She has it each time before foaling, commencing six weeks or two months before generating. The swelling extends from the udder forward in two ridges (one on each side of the abdomen), and seems to be two inches or two and a half inches thick. Her legs do not swell, and she eats

well, and is apparently in good health. Please give remedy, and advise treatment, etc.

Local swelling is of general occurrence in brood-mares during the latter half of the term of gestation; is of a harmless nature, and requires no special attention, except when very extensive and painful, when some sedative and cooling application may be of service, such as a lotion composed of one part each of tincture of opium and Goulard's extract and ten parts of soft water, of which mixture a sufficiency may be applied thrice daily. Such a mare should be given liberty of exercise during fair weather, and when grass exists, pasturage, together with limited allowance of oats. Let her have common salt, kept in a separate small trough in a convenient place under shelter from wet; also provide access to pure drinking-water.

(e.) *Drying up a Mare.*—Give, mixed among ground feed, every evening during ten or fourteen days one dram of powdered sulphate of iron; also apply to the bag, twice or thrice daily, a sufficiency of a solution of one ounce of camphor in six ounces of cotton-seed oil. To avoid danger of caking of the udder, when the mare is possibly a heavy milker, it would be best to gradually wean the colt, by letting it get to the mare twice a day during a week, and next week once a day, and thereafter begin the applications. Should, however, during the last week of weaning, or during the beginning of the applications, much tension of the udder be present, a portion of milk may be withdrawn by hand once or twice a day. The use of the sulphate of iron may be commenced immediately, but should not be continued longer than stated.

(f.) *Electrical Effects.*—The effects of lightning upon the object struck are manifold and various, and we see different results produced according to the varying circumstances. These results depend both upon the form of the lightning, that is, upon its quantity and intensity, and upon the receptivity or conductivity of the object struck. When

the effect of lightning is not fatal, more or less extensive paralysis may result, and the various internal and external organs, including the senses, may suffer temporary or permanent impairment. In case of light shock, it is likely the animal will entirely recover in the course of time; but recovery is always slow. The constitution should be supported by generous nutritive feeding and by the use of nerve stimulants, such valeriana, nux vomica, etc. A teaspoonful of tincture of nux vomica in a teacupful of water may be given morning and evening mixed in three quarts of ground feed. This may be continued during alternate weeks for some time. The eyes and ears would be benefited by repeated blistering behind and below the ears, but not near the eyes. The bottle containing the tincture of nux vomica should be labeled "POISON," and kept where children or others can not interfere with it.

VIII. Diseases of the Limbs.—(a.) *Abnormal Position in Colts.*—J. B. D., Hinsdale, Ill.:

This colt could not stand for several days after birth, and at ten days^s old the colt was so weak that both pastern-joints touched the ground, and the knee-joints turned out.

No ordinary bandaging can be of any service in such a case. If anything, sheet-iron splints specially made to fit, properly padded and adjustable to the feet and the parts above, will be required. Skill and mechanical ingenuity, together with a knowledge of proper bandaging, etc., will be required to insure usefulness. A variety of details in the management and daily care of such a case, most of which can be suggested only at the time and place, are necessary to observe. In short, such a case will require an exceptionally skilled veterinarian's personal attendance, and very few such men can be found that have any experience or practical knowledge in handling such cases. If the malposition of the limbs can be amended or altered, it must be at once; for it will not be long before the joint surfaces and the ligaments and tendons conform themselves to the

existing condition in such a manner that alteration is rendered impossible. If the position described can not be rectified, the animal will forever be useless for any purpose; in fact, it would be cruel to continue its existence.

(b.) *Sweeny, So-called.*—"Sweeny" is a name commonly given to a state of wasting of the muscles in various parts of the body or limbs of a horse. Wasting of the muscles is a symptom often accompanying chronic or painful disease of the extremities. For this reason, sweeny can not be considered an independent affection, and must be regarded as only one of the symptoms evinced by an established diseased condition of the parts contiguous to or remote from the recognized seat of wasting. If, instead of treating sweeny as a local affection, proper attention were bestowed upon the original affection, the symptom "sweeny" would gradually disappear, provided that the original disease is at all curable. Any mode of treatment for sweeny is useless, or at best only of a temporary local benefit, so long as the cause of this symptom is not removed. Sweeny, or wasting of the muscles of the shoulder, or of the hip or rump, may be, and often is, due to some chronic or painful disease of the lower parts of the limbs, such as injuries of the bones or joints below, or painful spavins or ringbone; and the sweeny above will remain, more or less extensively, so long as the morbid condition exists below in a painful or progressive state.

Occasionally, however, sweeny of the shoulder is due to severe sprain, etc., of the shoulder, such as in young horses from hard work, uneven pulling, or plunging in the harness, and only in such or similar cases may medical application to this part be of some benefit. Should the wasting be caused by injury of the shoulder, we would recommend the use of stimulants or rubefacients, such as camphorated liniment of ammonia, or of so-called sweating-blisters, or the insertion of one or two setons.

(c.) *Inflammation of the Joints.*—In inflammation of joints, the result of sprain or concussion, there is often a great tendency to an adventitious growth of fibrous tissue,



Ringbone and Sidebone—the first stage being inflammation.

- | | |
|---|---------------------------------------|
| 1. Os suffraginis. | coronæ, but still |
| 2. Os coronæ. | incomplete in |
| 3. Os pedis. | the joint above. |
| 4. Complete union by ossific matter between the os pedis and os | 5. Complete union of the three bones. |

which subsequently becomes converted into a kind of cartilage, and by a further change into bone. Small bony tumors are occasionally found on the substances of fibrous tissue, floating loosely in the stifle, also in the hock-joint. In severe injuries of joints, whether from concussion or blows, there is often more or less inflammation of the bony structure and of the membrane which invests the bone, as frequently shown by the throwing out of bony matter and by its depriving the joint cartilages of their proper nutriment, whereby they become ulcerated. Such results are frequently the effects of a kick, especially when near the stifle or some other joint, the symptoms of which for the first week or ten days

may not, to the inexperienced, appear to be serious, as the animal may be scarcely lame or suffer much pain until the bone becomes so much inflamed that it may be quite impossible to prevent ulceration of the joint cartilage. The treatment of injuries to or near to joints,

also of open joints, should first be treated by uninterrupted cold applications. This may be most conveniently effected as follows: On the floor of the loft over the horse, or in some manner, fifteen or twenty feet above the stable-floor, place a large tub, to the bottom of which connect an india-rubber tube or small hose with a brass top and cock. By means of strings fastened to the hose, this can be fastened either to a crupper-strap or to a surcingle, and again with strings loosely tied to the limb, in such a manner that a constant small stream of water can traverse the injured parts. It should be so arranged that there is ample hose to allow the animal to lie down without destroying the fixings. In cases where the injury is of a dangerous nature, the water may be thus applied during the whole of the day, and continued daily for a month, if necessary; that is, if we see there is sufficient pain in the part to induce the animal to hold his foot off the ground more or less. Should the pain continue longer than about that time, we may have recourse to blistering over a very large surface round the injured part, and repeat the blister as often as may be necessary. If the injured joint is one which will admit of a linseed-meal poultice being easily applied by night, it should be done. Only in the most severe cases is it necessary to continue the cold water application for a month, but under this treatment cases often recover which would not be cured by any other means. In severe injuries, it is often necessary to put the horse into slings, more especially if the injury be to a hind-leg; also to remove all the shoes, to prevent founder.

(d.) *Bone Spavin*.—Spavin assumes many aspects and possesses various virulence, from a slight and easily "curable" damage to an inveterate blemish or incurable disease. It is induced by kicks, bruises, leaping, overstraining, and rapid galloping, but especially by the over-

working of a young horse before its limbs have sufficient strength, and by faulty and uneven shoeing. A spavin from a kick or blow is usually a mere bruise on the bone, or on the membrane which covers it, and can easily be



Exostosis, constituting Spavin.

1. Os scaphoides.
2. Os cuneiform parvum.
3. Morbid growth of bone, constituting the disease known as bone spavin.
4. Large metatarsal or cannon bone.

cured; a spavin on the lowest part of the hock is of less consequence than one between the small bones of the hock-joint; a spavin near the edge of the limb is not so bad, because it does not so much affect the bending of the hock as one toward the middle; and a spavin of any kind in a colt or young horse is less inveterate than a spavin of the same kind in a fully matured horse, and very much less so than one in a decidedly old horse.

In the earlier stages of bad bone spavin, a degree of lameness is always induced, and this is sometimes so great as to render the animal apparently all but worthless; but in the maturer stages, when the membrane of the bone becomes accommodated to the excrescence, the lameness decreases, and often totally disappears.

The proper medical application for any ordinary bone spavin is a blister. The hair covering the affected part should be cut close to the skin; blistering ointment ought, in the morning, to be spread thickly over the part; and in the evening a coat of hog's lard may be spread over this, and be repeated once daily until the scab which forms after the blistering has peeled off, which generally occurs

within ten or twelve days. A second application may then be made, and this is usually more effective than the first, and in the case of colts or young horses often completes the cure. In very bad cases, so many as six or seven successive applications of blister may be necessary; and they are not at all likely to aggravate the disease or occasion any other blemish, but, on the other hand, will generally effect a cure; yet, after the second time, they must not be repeated with greater rapidity than at intervals of fourteen, or even twenty-one days. A spavin which involves the joint surfaces of the small bones, and any ordinary spavin in an old animal, may be regarded as incurable. Blistering, at all events, will not subdue such cases; and either the use of hot iron or some more powerful agent than ordinary Spanish fly blister is the only probable remedy, but ought not to be employed without full consideration of risks, and may not unlikely destroy the limb, or at least greatly aggravate the existing lameness. The safest method, in even the worst cases, is to give full trial to blistering; and, when this fails, to rest contented with whatever degree of amelioration can be obtained from the slow and steady working of the animal.

[From the foregoing, it will be apparent that those who pretend to cure spavin in its mature form are charlatans, and especially those who pretend to cure by taking (eating) out the spavin are common swindlers; any professional veterinarian can do it, *but they do not*, for they know that the disability remains, and will tell you so. The same rule will apply to chronic cases of ringbone, etc., when bony deposit has taken place.—EDITOR.]



To feel for a Spavin.

(e.) *Sprained Hock*.—After a few days of frequent application of ice-cold water, use frequent daily bathings with a mixture of one part of Goulard's extract and ten parts of soft water. When, after ten to fourteen days, the swelling has been reduced and tenderness has subsided, and no lameness is apparent, treatment may be discontinued, but the horse should not be used for any work for some time. If, however, after that time, the horse should go lame when trotted by the hand, blistering may then be resorted to. Before blistering, clip the hair short all around the hock, tie the tail up, and fasten the horse so that he can not reach the hock with his mouth. This should be done in the morning. A sufficiency of a



A Clean Hock.

blister composed of two drams of powdered cantharides, half an ounce of oil of turpentine, and two ounces of hog's lard should be rubbed well into the skin. Toward evening, the horse may be tied as usual. Another coat of the same kind of blister may be applied the next morning, but without much rubbing. Without washing off the blister, apply once a day during a fortnight a coat of hog's lard, without disturbing or attempting to remove the scabs or crusts that may form.

It may be necessary, a month after the last application of blister, to repeat the same treatment. In cases of severe sprains, like the one under consideration, it is wrong to begin treatment by applying stimulating liniments or blisters; these should never be used before heat, tenderness, and swelling have been reduced by cooling and sedative applications, such as those above mentioned. While under treatment, the diet should be reduced to half the usual amount. Absolute rest and quietude constitute half the care in all such cases. In order to give the horse a chance

to change posture or position to suit his comfort, it is better to let him go loose in a roomy box-stall or comfortable shed. Only after all signs of lameness have disappeared will it be proper to give moderate daily exercise. The treatment is identical for the sprain of any joint.

(f.) *Capped Hock*.—This name is given to any enlargement of the point of the hock the result of a bruise, most commonly produced by horses rolling in their stables, especially if they have not much bedding. Some horses are much more in the habit of rolling than others. Capped hock is also produced by kicking at the sides of the stall, or while in harness. When recent, it is the result of inflammation of cellular tissue and effusion of serum into that structure of the cap formed by the skin and connected to the outer covering of the broad tendinous expansion which plays on the *os calcis*. In severe cases, arising from repeated kicking, there is often an effusion of lymph, which may either become organized or degenerate into pus, or a tumor varying in its consistence may be the result. In whatever state the disease may exist, it has rarely any communication with the synovial cavities beneath the tendon on the point of the hock.

Treatment in the earlier stage consists in reducing the inflammation by constant application of cold water and hand-rubbing; should that not produce entire absorption of the effused material, then apply carefully with a feather once a week on both sides of the hock over a large surface, omitting the affected part, not less than one ounce of tincture of iodine, the strength of which is four ounces of iodine to twenty ounces of methylated spirit.

[The treatment of capped elbow is identical with the foregoing.—EDITOR.]

(g.) *Curbed Hock*.—A curb is produced by some inordinate action of the hock, more especially in young horses

when in bad condition. In its simple form, it is an enlargement of the sheath of the tendons, so that the one passing over the distended part of the sheath is raised out of the straight line. It may be attended with lameness, but it is more commonly not, unless the sprain or injury be of a



Curby Hock.

more severe character, or if the horse with a simple curb be repeatedly overweighted or overpaced, in which case the sheath and tendon become sprained and inflamed, and the fibrous structures of the tendons and other tissues in connection become thickened and enlarged. Enlargement is the first indication of curb, and often without any lameness.

The treatment of curb is very simple. After continued applications of cold water to the hock for a couple of days, apply repeated blisters of Spanish fly, which, after the hair has been cut very short, may extend half-way of each side of the hock.

(h.) *Bog-Spavin*.—Bog-spavin is a puffy enlargement on the inner side of the hock-joint, and is essentially the result of synovitis, there being an increased amount of synovial fluid (so-called joint-oil) in the joint, which causes the capsule to bulge on the inner and forward part of the hock, that being the weakest. In some cases, the inflammation of synovial membrane is acute, and the fluid is soon absorbed, but more frequently it is of a subacute character. The balance between effusion and absorption being deranged, there is a chronic filling of the joint by synovia, which has a tendency to become more or less viscid in its nature, and consequently less easily absorbed. During the time the horse is working or being exercised, the fluid becomes more or less absorbed, in some cases so much so that the disease may not be noticeable until the horse has been standing for some time. The treatment in recent

and acute cases consists in rest, laxative medicine, and frequently repeated bathing with cold water during two days; after which, if necessary, apply extensively the tincture of iodine. In the treatment of all synovial enlargements, it is of much importance to give the animal a long rest. In some rare instances, hard tumors form at the seat of bog-spavin, and occasionally they even become bony.

(i.) *Ringbone*.—If by repeated blistering lameness and pain could only be removed, and the further progress of the disease stopped, then all we could reasonably expect to be gained by the treatment would have been gained. The bony enlargement, once established and solid, can not be removed by treatment; hence the application of the hot iron for this purpose would be a cruel act. Firing or blistering, or both, are resorted to as means of cure in cases of ringbone only with the expectation of obtaining



The pastern and pedal bone with severe Ringbone.



Aggravated Ringbone.

the results first above stated. Possibly, by repeating the blistering at intervals of two or three weeks, and meanwhile giving the animal freedom from work, and liberty on pasturage during the balance of the season, a cure, so far as cure in such a case is possible, may be obtained. The use of a red-hot iron in the hands of a novice would be apt to result disastrously, for the necessary delicacy, skill, and dexterity could not be attained by anyone by simply reading a description of the *modus operandi*.

(j.) *Thorough-pin*.—The so-called thorough-pin is similar to windgall, and, like this, is seldom permanently curable. It is apt to return when the animal is again put to steady work. Those smaller or of recent origin may be

reduced by rest and not bandaging, or compress bandage kept wet with oak-bark decoction. A truss especially made for this purpose may be had in some of the larger saddlery establishments. In cases of long standing, both firing and blistering are resorted to, but often unsuccessfully.



Thorough-pin.

(k.) *Knee-sprung*. — This deformity is generally the sequel to severe and repeated sprains of the flexor tendons, or inflammation of these, which latter is generally of a chronic nature. Contraction or shortening of the said tendons from such causes is generally of a permanent nature, for medical treatment is rarely of any benefit. In young animals, the removal of the shoes, entire freedom from use or work of any kind, and a year's liberty out-doors (except during very cold and wet days and nights), will prove of material benefit. Repeated blisterings, or firing and blistering, have their advocates; but besides the appearance of the limb becoming still more unsightly, very little benefit is gained, at least so far as the crookedness of the limb is concerned. With a view of lessening the strain upon the shortened tendons, the heel should not be pared too low, and a thick-heeled shoe should be used. In the stable, such horse should not stand upon a slanting stall-floor; in fact, such horse ought always to have liberty to change his position to suit himself, for which reason he ought never to be tied in the stable, but should be kept loose in a roomy box-stall or comfortable shed. A splint, if it should be situated just under the knee-joint, may have something to do with the existence of contracted tendons; in fact, it is about the worst place a splint can be located, as in that place it is likely to remain a continuous source of interference with the freedom of the tendon immediately overlying it. A splint in that place is likely to remain a

fixture, though it is apt to become smaller (albeit very slowly) by gradual absorption as the animal grows older.

(*l.*) *Grease*.—This ailment occurs sometimes in the fore-feet, but oftener in the hind-feet; and though neither contagious nor epizootic, it not infrequently appears about one time, or within a brief period, on most or all of the horses in a stable. It essentially consists in a stoppage of the normal secretions of the skin, which are beneficially provided for maintaining a soft condition of the skin of the heel, and preventing chapping and excoriation, and it usually develops itself in redness, dryness, and scurfiness of



First stage of confirmed Grease.
(Exudation.)



Second stage of confirmed Grease.
(Cracks.)

the skin; but in bad or prolonged cases it is accompanied with deep cracks, an ichorous discharge, more or less lameness, and even great ulceration and considerable fungous growth; and in the worst cases it spreads athwart all the heel, extends on the fetlock, or ascends the leg, and is accompanied with extensive swelling and a general oozing discharge of a peculiar strong, disagreeable odor.

Most of the causes of grease are referable to bad management, especially in regard to great and sudden changes in the exterior temperature of the heels. The feet of the horse may be alternately heated by the bedding and cooled

by draft from the open stable-door; or they may first be made hot and sensitive by the irritating action of the urine and filth on the stable-floor, and then violently reacted on by the cold breezes of the open air; or they may be moist and reeking when the horse is led out to work, and then chilled for a long period by the slow evaporation of the moisture from them amid the clods and soil of the field; or they may be warm, and even perspiring, with the labor of the day, and next plunged into a stream or washed with cold water, and then allowed to dry partly in the open air and partly in the stable; and in many of these ways, or of any others which occasion sudden changes of temperature in the heels, especially when those changes are accompanied or aggravated by the irritating action of filth, grease is exceedingly liable to be induced. Want of exercise, high feeding, and whatever tends to accumulate or to stagnate the normal greasy secretion in the skin of the heels, also operate, in some degree, as causes. By mere good management and by avoiding these known causes, horse-owners might prevent the appearance of this disease altogether.

In the early, dry, scurfy stage of grease, the heels may be well cleaned with soft soap and water, and afterward thoroughly dried, and then treated with a dilution of Goulard's extract—one part to eight parts of water, or one part with six parts of lard-oil. In the mildest form of the stage of cracks and ichorous discharge, after cleansing, some drying powder, such as equal quantities of white lead and putty (impure protoxide of zinc), may be applied, or simply the mixture of Goulard's extract with lard-oil may be continued. In the virulent form of cracks, accompanied with ulceration, the heels ought to be daily washed clean with warm water, and afterward bathed with a mild astringent lotion, and every morning and evening thinly poulticed or

coated with carbolized ointment; and the whole system ought to be acted on by alteratives, by nightly bran-mash, and, if the animal be in full condition, with a dose of purgative medicine. In the worst and most extensively spread cases, poultices of a very cooling kind, particularly poultices of scraped carrots or scraped turnips, ought to be used day and night, both for the sake of their own action and as preparatives to the action of the astringent application; and the whole course of treatment ought to aim at the abatement of the inflammatory action previous to the stopping of the discharge. Nothing tends so much to prevent grease and swelling of the legs as frequent hand-rubbing and cleansing the heels carefully as soon as a horse comes in from exercise or work. In inveterate cases of grease, where the disease appears to have become habitual in some degree, a run at grass, when in season, is the only remedy. If a dry paddock is available, where a horse can be sheltered in bad weather, it will be found extremely convenient, as in such circumstances he may perform his usual labor and at the same time be kept free from the complaint.

(*m.*) *Scratches.*—The heels become more or less tender and hot or feverish; small pustules form, which burst and leave a sore, ulcerating surface. There may be stiffness of gait, pain, and sometimes itching. In slight cases, the skin of the heel appears merely chapped. The ailment is often superinduced by a plethoric condition of the system, or it may be caused or aggravated by exposure to much wet or filth, and especially during spring and autumn, during which time, especially when horse's legs are much trimmed or deprived of their natural hairy covering, the disease may assume a chronic or inveterate form. It may become so aggravated as to cause fissures in the skin, with hardened edges, and a slow sloughing process tends to incapac-

itate the animal for work. The treatment consists in moderate diet, cleanliness of the whole body, keeping the limbs clean and dry, and using mild astringent lotions, such as a mixture of half an ounce of Goulard's extract and half a pint of soft water; or, an ointment made of one part of subacetate of lead and eight parts of hog's lard. Advantage is derived from the use of oxide of zinc, in powder, which may be applied alone upon the raw surface or mixed with one-half or an equal quantity of finely powdered starch. Do not expose the horse to wet or filth, and keep his place in the stable free from draft, especially from behind. Suspend all washing of the heels and keep them clean by wiping with a moist chamois-skin. A tablespoonful of flowers of sulphur may be mixed among the food every evening. It is also well to keep common salt within reach of the horse, but do not mix it among the food. [See "Grease."—EDITOR.]

(n.) *Cracked Heels*.—Attend first to cleanliness and dry flooring. Apply, during one to two days, poultices of equal parts of boiled turnips and charcoal mashed together. Thereafter apply twice daily a sufficiency of an ointment made of one part of flowers of sulphur, two parts of pine tar, and three parts of hog's lard, all by weight. Give a bran-mash twice or thrice a week, among which mix half an ounce of powdered saltpetre; but the saltpetre should not be continued longer than thrice a week during one month, or the kidneys may suffer injury.

In old-standing cases, the fissures in the skin may apparently heal up all right; but as long as any thickening of the part, or inflammation in it, remains, the skin will be apt to become sore again on very slight provocation. If the skin is at all tender, or if there exist in it any scars from previous attacks of this inflammation, the quicker the work for which the horse is used, the more liable will the ailment

be to assume an aggravated form, or to commence anew, as the case may be, on account of the skin of the part being subjected to a greater amount of bending, and being more exposed to chill, than when the work was slow. The fibrous tissue which forms the white mark left by a scar does not possess the same degree of elasticity and suppleness as the uninjured skin. Besides this, when the skin is inflamed, it is but poorly supplied with lubricating fluid from the oil-glands, and is then not so well calculated to resist the effects of severe and continued bending.

(o.) *Elephant-Leg*.—The so-called elephant-leg in horses is due to a slow, chronic form of inflammation, often co-existing with or due to grease, inflammation of the fibrous tissue enveloping the bones of the limb, etc., and appears as a flat, very slowly increasing swelling or filling up of the cellular tissue underneath the skin, with scarcely any increase of heat, and not very painful. The swelling, as it increases, becomes harder; heat and tenderness disappear; and we then have what is often termed a milk-leg; and when very large, an elephant-leg. Treatment, which does not generally prove of much benefit, and demands considerable patience of the owner or attendant, requires freedom for out-door exercise during fair weather, frequently applied pressure and friction, tight bandaging, and the daily application of such as hot soap-suds or lye of ashes, besides occasional laxative doses of aloes and a tablespoonful each of ground juniper-berries and Glauber's salts, mixed among ground feed every night during every other week.

(p.) *Swelled Legs (Stocking)*.—This occurs mostly in horses deprived of sufficient exercise, or from local debility, and is generally confined to the hind-legs. It also occurs in cases of disease of the frog or other parts of the foot, and in cases of general debility. It generally disappears

after exercise, and returns over night, or after a day's rest. Strong friction of the limbs will, in slight cases, cause its disappearance. After such friction, or after exercise, apply



Horse's Leg,
natural.

spirits of camphor, or high-wine, or weak lye of ashes, also with friction. In all cases, apply a linen roller bandage thereafter. In prolonged cases, a laxative dose of aloes (four to six drams) will be of service, besides the local application, which latter may be repeated twice or thrice daily. If preferred, instead of the laxative, nitrate of potash may be given, powdered, of which a teaspoonful may be mixed with



Leg swollen or
filled. Incipi-
ent Scratches.

ground feed morning and evening, but this should not be continued longer than during a week or ten days.



Acute Gastritis from poisoning.

PART XVIII.

MEDICINES, AND SAFE DOSES TO ADMINISTER.

I. Alteratives (*Change Conditions and Functions of Organs*).—They replace unhealthy by healthy action, producing their effect by acting slowly but steadily on the organs of depuration (cleansing), as the skin, liver, and kidneys.

In Disordered Conditions of the Skin—

Emetic tartar	- - - - -	5 ounces.
Powdered ginger	- - - - -	3 ounces.
Opium	- - - - -	1 ounce.

Syrup enough to form sixteen balls; one to be given every night.

(a.) *Cooling Alternative—*

Barbadoes aloes	- - - - -	1 ounce.
Castile soap	- - - - -	1½ ounces.
Ginger	- - - - -	½ ounce.

Syrup enough to form six balls; one to be given every morning.

Barbadoes aloes	- - - - -	1½ drams.
Emetic tartar	- - - - -	2 drams.
Castile soap	- - - - -	2 drams. Mix.

For General Use—

Black sulphuret of antimony	- - - - -	2 to 4 drams.
Sulphur	- - - - -	2 drams.
Nitre	- - - - -	2 drams.

Linseed-meal and water enough to form one ball.

For Defective Secretions—

Flowers of sulphur	- - - - -	6 ounces.
Emetic tartar	- - - - -	5 to 8 drams.
Corrosive sublimate	- - - - -	10 grains.

Linseed-meal mixed with hot water enough to form six balls, one of which may be given two or three times a week.

Debility of Stomach—

Calomel	- - - - -	1 scruple.
Aloes	- - - - -	1 dram.
Cascarilla bark,	} of each, in powder	1 dram.
Gentian-root,		
Ginger,		
Castile soap	- - - - -	3 drams

Syrup enough to make one ball, which may be given twice a week or every other night.

II. Anodynes (*Allay or Diminish Pain*).—When taken into the stomach, they pass at once into the blood; act in a special manner on the nervous centers; exalt the nervous force, but soon depress it. They are given either to soothe the general nervous system or to stop diarrhea; or sometimes to relieve spasm, as in colic, etc.

For Colic—

Linseed-oil	- - - - -	1 pint.
Oil of turpentine	- - - - -	1 to 2 ounces.
Laudanum	- - - - -	1 to 2 ounces.

Mix, and give every hour till relief is afforded.

For Colic in Mild Cases—

Powdered opium	- - - - -	$\frac{1}{2}$ to 2 drams.
Castile soap	- - - - -	2 drams.
Camphor	- - - - -	2 drams.
Ginger	- - - - -	1 $\frac{1}{2}$ drams.

Make into a ball with licorice powder and treacle, and give every hour while the pain lasts. It should be kept in a bottle or bladder.

Anodyne Ball, Ordinary Use—

Opium	- - - - -	$\frac{1}{2}$ to 1 dram.
Castile soap	- - - - -	2 to 4 drams.
Ginger	- - - - -	1 to 2 drams.
Powdered anise-seed	- - - - -	$\frac{1}{2}$ to 1 ounce.
Oil of caraway-seed	- - - - -	$\frac{1}{2}$ dram.

Syrup enough to form a ball; to be dissolved in half a pint of warm ale, and given as a drench.

In Superpurgation, or Ordinary Diarrhea—

Gum arabic	- - - - -	2 ounces.
Boiling Water	- - - - -	1 pint.
Dissolve, and then add—		
Oil of peppermint	- - - - -	25 drops.
Laudanum	- - - - -	$\frac{1}{2}$ to 1 ounce.

Mix, and give night and morning, if necessary.

Chronic Diarrhea—

Powdered chalk and gum arabic, each	- - - - -	1 ounce.
Laudanum	- - - - -	$\frac{1}{2}$ ounce.
Peppermint water	- - - - -	10 ounces.

Mix, and give night and morning.

III. Anthelmintics (*Expel Worms*).—Their action is by producing a disagreeable impression on the worms, and also by irritating the mucous lining of the bowels, and thus causing them to void their contents.

Mr. Gamgee's Worm Ball—

Asafetida	- - - - -	2 drams.
Calomel	- - - - -	$1\frac{1}{2}$ drams.
Powdered savin	- - - - -	$1\frac{1}{2}$ drams.
Oil of male fern	- - - - -	30 drops.

Treacle enough to make a ball, which should be given at night, and followed by a purge next morning.

Mild Form, for Worms—

Linseed-oil	- - - - -	1 pint.
Spirits of turpentine	- - - - -	2 drams.

Mix, and give every morning.

IV. Antispasmodics (*Counteract Excessive Muscular Action, or Spasm*).—The following exercises a peculiar control over spasm:

In Colic—

Spirits of turpentine	- - - - -	$3\frac{1}{2}$ ounces.
Laudanum	- - - - -	$1\frac{1}{2}$ ounces.
Barbadoes aloes	- - - - -	1 ounce.

Powder the aloes, dissolve in warm water, add the other ingredients, and give as a drink, turned down.

Clyster in Colic—

Spirits of Turpentine	- - - -	6 ounces.
Aloes	- - - -	2 drams.

Dissolve in three quarts of warm water, and stir turpentine well in.

Antispasmodic Drink—

Gin	- - - -	4 to 6 ounces.
Tincture of capsicum	- - - -	2 drams.
Laudanum	- - - -	3 drams.
Warm water	- - - -	1½ pints.

Mix, and give as drench (to be used only when there is inflammation).

V. Aperients (*Gently Open the Bowels*).—Aperients quicken or increase the evacuations from the bowels, varying much in their mode of operation. Some act by exciting the muscular coat of the bowels to contract; others cause a great watery discharge; a third set combine the action of the two. Purgatives are also classed, according to the degree of their effect, into laxatives, acting mildly, and cathartics, acting very severely.

Ordinary Physic Balls—

Barbadoes aloes	- - - -	3 to 8 drams.
Hard soap	- - - -	4 drams.
Ginger	- - - -	1 dram.

Dissolve in as small a quantity of boiling water as will suffice; slowly evaporate to the proper consistence, to avoid griping.

A Warm Physic Ball—

Barbadoes aloes	- - - -	3 to 8 drams.
Carbonate of soda	- - - -	½ dram.
Aromatic powder	- - - -	1 dram.
Oil of caraway	- - - -	12 drops.

Dissolve as above, and then add the oil.

Gentle Laxative Ball—

Barbadoes aloes	- - - -	3 to 5 drams.
Rhubarb powder	- - - -	1 to 2 drams.
Ginger	- - - -	2 drams.
Oil of caraway	- - - -	15 drops.

Mix, and form into a ball, as before stated.

Stomachic Laxative Balls—

Barbadoes aloes	-	-	-	-	3 drams.
Rhubarb	-	-	-	-	2 drams.
Ginger	-	-	-	-	1 dram.
Cascarilla powder	-	-	-	-	1 dram.
Oil of caraway	-	-	-	-	15 drops.
Carbonate of soda	-	-	-	-	1½ drams.

Dissolve the aloes as before, and add the other ingredients.

Purging Balls with Calomel—

Barbadoes aloes	-	-	-	-	3 to 6 drams.
Calomel	-	-	-	-	½ to 1 dram.
Rhubarb	-	-	-	-	1 to 2 drams.
Ginger	-	-	-	-	½ to 1 dram.
Castile soap	-	-	-	-	2 drams.

Mix as before stated.

(a.) Liquid Laxative Drink—

Barbadoes aloes	-	-	-	-	3 to 4 drams.
Canella alba,	-	-	-	-	1 to 2 drams.
Salt of tartar	-	-	-	-	1 dram.
Mint-water	-	-	-	-	8 ounces. Mix.

(b.) Laxative Dose—

Castor-oil	-	-	-	-	3 to 6 ounces.
Barbadoes aloes	-	-	-	-	3 to 5 drams.
Carbonate of soda	-	-	-	-	2 drams.
Mint-water	-	-	-	-	8 ounces.

Dissolve the aloes in the mint-water by heat, and add the other ingredients.

(c.) A Mild Drench—

Castor-oil	-	-	-	-	4 ounces.
Epsom salts	-	-	-	-	3 to 5 ounces.
Gruel	-	-	-	-	2 pints. Mix.

(d.) Very Mild Laxative—

Castor-oil	-	-	-	-	4 ounces.
Linseed-oil	-	-	-	-	4 ounces.
Warm water or gruel	-	-	-	-	1 pint. Mix.

Alterative for Staggers—

Barbadoes aloes	-	-	-	-	4 to 6 drams.
Common salt	-	-	-	-	6 ounces.
Flour of mustard	-	-	-	-	1 ounce.
Water	-	-	-	-	2 pints. Mix.

Gentle Cooling Drench in Attacks of Cold—

Epsom salts	-	-	-	-	6 to 8 ounces.
Whey	-	-	-	-	2 pints. Mix.

Alterative and Purgative Clyster—

Common salt	-	-	-	-	4 to 8 ounces.
Warm water	-	-	-	-	8 to 16 pints.

VI. Astringents (*Cause Contraction of Tissues*).—

They are divided into astringents administered by the mouth, and those applied locally to externally ulcerated or wounded surfaces.

For Bloody Urine—

Powdered catechu	-	-	-	-	$\frac{1}{2}$ ounce.
Alum	-	-	-	-	$\frac{1}{2}$ ounce.
Cascarilla bark in powder	-	-	-	-	1 to 2 drams.

Licorice powder and molasses or honey to form a ball, given twice a day.

For Diabetes—

Opium	-	-	-	-	$\frac{1}{2}$ dram.
Ginger, powdered	-	-	-	-	2 drams.
Oak bark, powdered	-	-	-	-	1 ounce.
Alum, as much as the tea will dissolve.					
Camomile tea	-	-	-	-	1 pint.

Mix for a drench.

External Astringent Powders, External or Ulcerated Surfaces—

Powdered alum	-	-	-	-	4 ounces.
Armenian bole	-	-	-	-	1 ounce.
White vitriol	-	-	-	-	4 ounces.
Oxide of zinc	-	-	-	-	1 ounce. Mix.

Astringent Lotion—

Goulard extract	- - - -	2 to 3 drams.
Water	- - - -	$\frac{1}{2}$ pint.
Sulphate of copper	- - - -	1 to 2 drams.
Water	- - - -	$\frac{1}{2}$ pint. Mix.

(a.) Astringent Ointment for Sore Heels—

Acetate of lead	- - - -	1 dram.
Lard	- - - -	1 ounce. Mix.

(b.) Another—

Nitrate of silver, powdered	- - -	$\frac{1}{2}$ dram.
Goulard extract	- - -	1 dram.
Lard	- - -	1 ounce.

Mix; use a very little every night.

VII. Blisters, or Vesicants.—Blisters inflame the skin and produce a secretion of serum between the cutis and cuticle. There are two kinds, one for counter-irritation, to lessen irritation, the other called "sweating," by which a discharge is obtained from the part itself, and thus relieved.

(a.) Mild Blister Ointment (Counter-irritant)—

Hog's lard	- - - -	4 ounces.
Venice turpentine	- - -	1 ounce.
Powdered cantharides	- - -	6 drams.

Mix, and spread.

(b.) Stronger Blister Ointment (Counter-irritant)—

Spirits of turpentine	- - - -	1 ounce.
Sulphuric acid, by measure	- - -	2 drams.

Mix carefully in an open place, and add—

Hog's lard	- - - -	4 ounces.
Powdered cantharides	- - -	1 ounce.

Mix, and spread.

Very Strong Blister, or Counter-irritant—

Strong mercurial ointment	- - -	4 ounces.
Oil of origanum	- - -	$\frac{1}{2}$ ounce.
Finely-powdered euphorbium	- - -	3 drams.
Powdered cantharides	- - -	$\frac{1}{2}$ ounce.

Mix, and spread.

Rapid Blister as a Counter-irritant—

Best flour of mustard	- - -	8 ounces.
Made into a paste with water; then add—		
Oil of turpentine	- - -	2 ounces.
Strong liquor of ammonia	- - -	1 ounce.

To be well rubbed into the chest, belly, or back, as the case may be, in acute inflammation.

Sweating Blister—

Strong mercurial ointment	- - -	2 ounces.
Oil of origanum	- - -	2 drams.
Corrosive sublimate	- - -	2 drams.
Cantharides, powdered	- - -	3 drams.

Mix, and rub in with the hand.

Strong Sweating Blister for Splints, Ringbones, Spavins, etc.—

Biniodide of mercury	- - -	1 to 1½ drams.
Lard	- - -	1 ounce.

To be well rubbed into the legs, after cutting the hair short, followed by the daily use of arnica as a wash, to be painted on with a brush:

Tincture of arnica	- - -	1 ounce.
Water	- - -	12 to 15 ounces. Mix.

(a.) Liquid Sweating Blisters—

Cantharides	- - -	1 ounce.
Spirits of turpentine	- - -	2 ounces.
Methylated spirits of wine	- - -	1 pint.

(b.) Mix, and digest for a fortnight; then strain.

Powdered cantharides	- - -	1 ounce.
Commercial pyroligneous acid	- - -	1 pint.

Mix, and digest for a fortnight, and strain.

VIII. Caustics, or Cauteries (*to Destroy Proud-flesh in Wounds*).—They are of two kinds; first, the actual cautery—application of the burning-iron, called firing; and the potential cautery, by mineral caustics, as lunar caustic, corrosive sublimate, etc. Firing should only be done by a veterinary surgeon.

(a.) Lunar Caustic, or Nitrate of Silver—

Used to apply to profuse granulations.

(b.) Sulphate of Copper—

Not so strong as lunar caustic. It may be rubbed into all high granulations, as broken knees and similar growths.

(c.) Corrosive Sublimate in Powder—

This acts energetically upon warty growths, but should be used with discretion. It may be safely applied to small surfaces, but not without advice of a regular practitioner to large ones, and should be washed off after remaining on a few minutes.

(d.) Yellow Orpiment—

May be used with freedom. It will remove warty growths. Pick off the heads and rub it in.

(e.) Chloride of Zinc—

A most powerful caustic, and effective in old sinuses, in solution—seven drams in a pint of water.

Mild Caustic—

(f.) Verdigris, either in powder or mixed with lard as an ointment, in the proportion of 1 to 3.

(g.) Red precipitate, 1 to 3.

(h.) Burnt alum, used dry.

(i.) Powdered white sugar.

Mild Liquid Caustics—

(j.) Solution of nitrate of silver, five to fifteen grains to the ounce of distilled water.

(k.) Solution of blue vitriol, of about double the above strength.

(l.) Chloride of zinc, one to three grains to the ounce of water.

IX. Clysters (*for Injections*).—Relieve obstruction or spasm of the bowels. They may be made of warm water or gruel for colic, of which several quarts may be required. (See Antispasmodics.) (Aperient clysters, see Aperients.)

Anodyne Clyster in Diarrhea—

Starch, made as for washing - - - 1 quart.

Powdered opium - - - - 2 drams.

The opium is to be boiled in water and added to the starch.

X. Cordials.—These act as temporary stimulants to the system, and especially to the stomach. They augment the strength and spirits when depressed, as after over-exertion in work.

(a.) *Cordial Balls*—

Powdered caraway-seeds	- - - -	6 drams.
Ginger	- - - -	2 drams.
Oil of cloves	- - - -	20 drops.

Honey enough to make into a ball.

(b.) Powdered anise-seed	- - - -	6 drams.
Powdered cardamoms	- - - -	2 drams.
Powdered cassia	- - - -	1 dram.
Oil of caraway	- - - -	20 drops.

Mix with treacle into a ball.

(c.) *Cordial and Expectorant*—

Powdered anise-seed	- - - -	$\frac{1}{2}$ ounce.
Powdered squills	- - - -	1 dram.
Powdered myrrh	- - - -	$1\frac{1}{2}$ drams.

Balsam of Peru enough to form a ball.

(d.) Licorice powder	- - - -	$\frac{1}{2}$ ounce.
Gum ammoniacum	- - - -	3 drams.
Balsam of tolu	- - - -	$1\frac{1}{2}$ drams.
Powdered squills	- - - -	1 dram.

Linseed-meal and boiling water enough to form into a mass.

XI. Demulcents (*Sheathe and Protect Irritated Surfaces*).—Are used in irritation of the bowels, kidneys, or bladder; in the two last cases by their effect upon the secretion of urine.

Demulcent Drench—

Gum arabic	- - - -	$\frac{1}{2}$ ounce.
Water	- - - -	1 pint.

Dissolve, and give as a drench night and morning, or mixed with a mash.

Linseed	- - - -	4 ounces.
Water	- - - -	1 quart.

Simmer till a strong and thick decoction is obtained, and give as above.

Marsh-mallow Drench—

Marsh-mallows	-	-	-	-	A double handful.
Water	-	-	-	-	1 quart.

Prepare and use as the foregoing.

XII. Diaphoretics (*Cause Perspiration*).—Have special action on the skin, increasing perspiration sometimes enormously. Moderate exercise and clothing is required to bring out their effects, after which the horse should be rubbed till quite dry.

Ordinary Drench—

Solution of acetate of ammonia	-	-	3 to 4 ounces.
Laudanum	-	-	1 ounce.
Mix, and give at night.			
Solution of acetate of ammonia	-	-	2 ounces.
Spirits of nitric ether	-	-	2 ounces.

Mix, and give as above.

In Cases of Hide-bound—

Emetic tartar	-	-	-	-	1½ drams.
Camphor	-	-	-	-	¼ dram.
Ginger	-	-	-	-	2 drams.
Opium	-	-	-	-	½ dram.
Oil of caraway	-	-	-	-	15 drops.

Linseed-meal and boiling water, to form a ball, which is to be given twice or three times a week.

Hide-bound, Mild Form—

Antimonial powder	-	-	-	-	2 drams.
Ginger	-	-	-	-	1 dram.
Powdered caraway	-	-	-	-	6 drams.
Oil of anise-seed	-	-	-	-	20 drops.

Mix as above.

XIII. Digestives.—Applications promoting suppuration and the healing of wounds or ulcers.

Digestive Ointment—

Red precipitate	-	-	-	-	2 ounces.
Venice turpentine	-	-	-	-	3 ounces.
Beeswax	-	-	-	-	1 ounce.
Hog's lard	-	-	-	-	4 ounces.

Melt the last three ingredients over a slow fire, and when nearly cold stir in the powder.

XIV. Diuretics.—These promote the secretion and discharge of urine; some act directly upon the kidneys, while others are taken up by the blood-vessels, causing an extra secretion of the urine. Their effect is to diminish the watery part of the blood and promote the absorption of abnormal fluid into any of the cavities, or into the cellular membrane in forms of dropsy.

Stimulating Diuretic Ball—

Powdered resin	-	-	-	-	3 drams.
Sal prunelle	-	-	-	-	3 drams.
Castile soap	-	-	-	-	3 drams.
Oil of juniper	-	-	-	-	1 dram. Mix.

Cooling Diuretic Ball—

Powdered nitre	-	-	-	-	$\frac{1}{2}$ to 1 ounce.
Camphor	-	-	-	-	1 dram.
Juniper-berries	-	-	-	-	1 dram.
Soap	-	-	-	-	3 drams.

Mix, adding linseed-meal enough to form a ball.

Diuretic Powder for a Mash—

Nitre	-	-	-	-	$\frac{1}{2}$ to $\frac{3}{4}$ ounce.
Resin	-	-	-	-	$\frac{1}{2}$ to $\frac{3}{4}$ ounce. Mix.

A More Active Powder—

Nitre	-	-	-	-	6 drams.
Camphor	-	-	-	-	$1\frac{1}{2}$ drams. Mix.

XV. Embrocations.—Embrocations, or liniments, reduce the pain and inflammation of internal parts when rubbed into the skin with the hand.

Mustard Embrocations—

Pure flour of mustard	- - - - -	6 ounces.
Liquor of ammonia	- - - - -	1½ ounces.
Oil of turpentine	- - - - -	1½ ounces.

Mix with sufficient water to form a thin paste. Wash off with tepid water after being on fifteen or twenty minutes, and apply next day, or sooner if necessary.

Stimulating Embrocation—

Camphor	- - - - -	½ ounce.
Oil of turpentine	- - - - -	½ ounce.
Spirits of wine	- - - - -	½ ounce. Mix.

Sweating Embrocation for Windgalls, Bog-Spavin, etc.—

Strong mercurial ointment	- - - - -	2 ounces.
Camphor	- - - - -	½ ounce.
Oil of rosemary	- - - - -	2 drams.
Oil of turpentine	- - - - -	1 ounce. Mix.

Another, Stronger—

Strong mercurial ointment	- - - - -	2 ounces.
Oil of bay	- - - - -	1 ounce.
Oil of origanum	- - - - -	½ ounce.
Powdered cantharides	- - - - -	½ ounce. Mix

Very Active Sweating Embrocation—

Binioidide of mercury	- - - - -	½ to 1 dram.
Powdered arnica-leaves	- - - - -	1 dram.
Soap liniment	- - - - -	2 ounces. Mix.

XVI. Emulsions.—Specially useful in soothing irritation of the mucous membrane of the trachea and bronchi.

(a.) *Simple Emulsion—*

Linseed-oil	- - - - -	2 ounces.
Honey	- - - - -	3 ounces.
Soft water	- - - - -	1 pint.
Subcarbonate of potassa	- - - - -	1 dram.

Dissolve the honey and potassa in the water; add the linseed-oil by degrees in a large mortar, and work it until it forms a milky appearance. It may be given night and morning.

(b.) Active Emulsion—

Simple emulsion as in (a)	-	-	-	7 ounces.
Camphor	-	-	-	1 dram.
Opium, in powder	-	-	-	$\frac{1}{2}$ dram.
Oil of anise-seed	-	-	-	30 drops.

Rub the last three ingredients together in a mortar with some white sugar; then add the emulsion by degrees.

XVII. Expectorants.—Promote a discharge of mucus from the lining membrane of the bronchial tubes, relieving inflammation and allaying cough.

For Ordinary Cough, without Inflammation—

Gum ammoniacum	-	-	-	$\frac{1}{2}$ ounce.
Powdered squills	-	-	-	1 dram.
Castile soap	-	-	-	2 drams.

Honey enough to form a ball.

For Old-standing Stomach Cough—

Asafetida	-	-	-	3 drams.
Galbanum	-	-	-	1 dram.
Carbonate of ammonia	-	-	-	$\frac{1}{2}$ dram.
Ginger	-	-	-	$1\frac{1}{2}$ drams.

Honey enough to form a ball.

Strong Expectorant Ball—

Emetic tartar	-	-	-	$\frac{1}{2}$ dram.
Calomel	-	-	-	15 grains.
Digitalis	-	-	-	$\frac{1}{2}$ dram.
Powdered squills	-	-	-	$\frac{1}{2}$ dram.

Linseed-meal and water enough to form a ball, but not to be repeated without great care.

XVIII. Febrifuges (*Counteract Fever and Lower the Temperature*).—Allay the arterial and nervous excitement accompanying febrile action.

(a.) Fever Ball—

Nitre	-	-	-	4 drams.
Camphor	-	-	-	$1\frac{1}{2}$ drams.
Calomel and opium, of each	-	-	-	1 scruple.

Linseed-meal and water enough to form a ball.

- (b.) Emetic tartar - - - - - 1½ to 2 drams.
 Compound powder of tragacanth - - - 2 drams.
 Linseed-meal as above.
 (c.) Nitre - - - - - 3 drams.
 Camphor - - - - - 2 drams.
 Mix as above.

Cooling Powder—

- Nitre - - - - - 6 drams to 1 ounce.
 May be given in a bran-mash.

Cooling Drench—

- Nitre - - - - - 1 ounce.
 Sweet spirits of nitre - - - - - 2 ounces.
 Tincture of digitalis - - - - - 2 drams.
 Whey or water - - - - - 1 pint.

XIX. Lotions.—Liquids applied to external parts, to cool them or to produce a healthy action.

For External Inflammation—

- Goulard extract - - - - - 1 ounce.
 Vinegar - - - - - 2 ounces.
 Spirits of wine or gin - - - - - 3 ounces.
 Water - - - - - 1½ pints.
 Mix, and apply with a muslin bandage.

For Inflamed Limbs, Galled Shoulder or Back—

- Sal ammoniac - - - - - 1 ounce.
 Vinegar - - - - - 4 ounces.
 Spirits of wine - - - - - 2 ounces.
 Tincture of arnica - - - - - 2 drams.
 Water - - - - - ½ pint. Mix.

For Foul Ulcers—

- Sulphate of copper - - - - - 1 ounce.
 Nitric acid - - - - - ½ ounce.
 Water - - - - - 8 to 12 ounces. Mix.

For the Eyes—

- Sulphate of zinc - - - - - 20 to 25 grains.
 Water - - - - - 6 ounces. Mix.

XX. Stimulants.—Stimulants particularly excite the action of the whole nervous and vascular systems. Almost all medicines are stimulants to some part or other, as, for instance, aperients, which stimulate the lining of the bowels, but to the general system are lowering.

English Stimulant—

Old ale	-	-	-	-	-	1 quart.
Carbonate of ammonia	-	-	-	-	-	$\frac{1}{2}$ to 2 drams.
Tincture of ginger	-	-	-	-	-	4 drams.

Mix, and give as a drench.

XXI. Stomachics.—Stomachics improve the tone of the stomach when impaired by bad management or disease.

(a.) *Stomach Ball—*

Powdered gentian	-	-	-	-	$\frac{1}{2}$ ounce.
Powdered ginger	-	-	-	-	$1\frac{1}{2}$ drams.
Carbonate of soda	-	-	-	-	1 dram.

Treacle to form a ball.

(b.) Cascarilla, powdered	-	-	-	-	1 ounce.
Myrrh	-	-	-	-	$1\frac{1}{2}$ drams.
Castile soap	-	-	-	-	1 dram.

Mix with syrup or treacle into a ball.

(c.) Powdered colombo	-	-	-	-	$\frac{1}{2}$ to 1 ounce.
Powdered cassia	-	-	-	-	1 dram.
Powdered rhubarb	-	-	-	-	2 drams.

Mix as in (a).

XXII. Styptics.—Styptics are remedies having a tendency to stop the flow of blood either from internal or external surfaces. The hot iron is always best in profuse external bleeding. If the part can not be reached with the heated iron, and may be by injection, as in bleeding from the nostrils, the following may be employed:

Matico leaves	-	-	-	-	$\frac{1}{2}$ ounce.
Boiling water	-	-	-	-	1 pint.

Infuse, and when cold strain and inject into the cavity.

For internal use, see Astringents.

Tonic Ball—

Extract of camomile	-	-	-	1 ounce.
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A Powerful Tonic—

Compound powder of tragacanth 2 drams.

NOTE.—In forming balls, they should be about the size and shape of the thumb. They are given by gently drawing out the tongue to one side, and placing the ball well back in the mouth, release the tongue immediately, and then hold up the head until the effort is made to swallow. It requires some dexterity to give a ball, and in the case of nervous or vicious horses, great care must be taken not to get bitten. A Balling iron should be kept in large stables.



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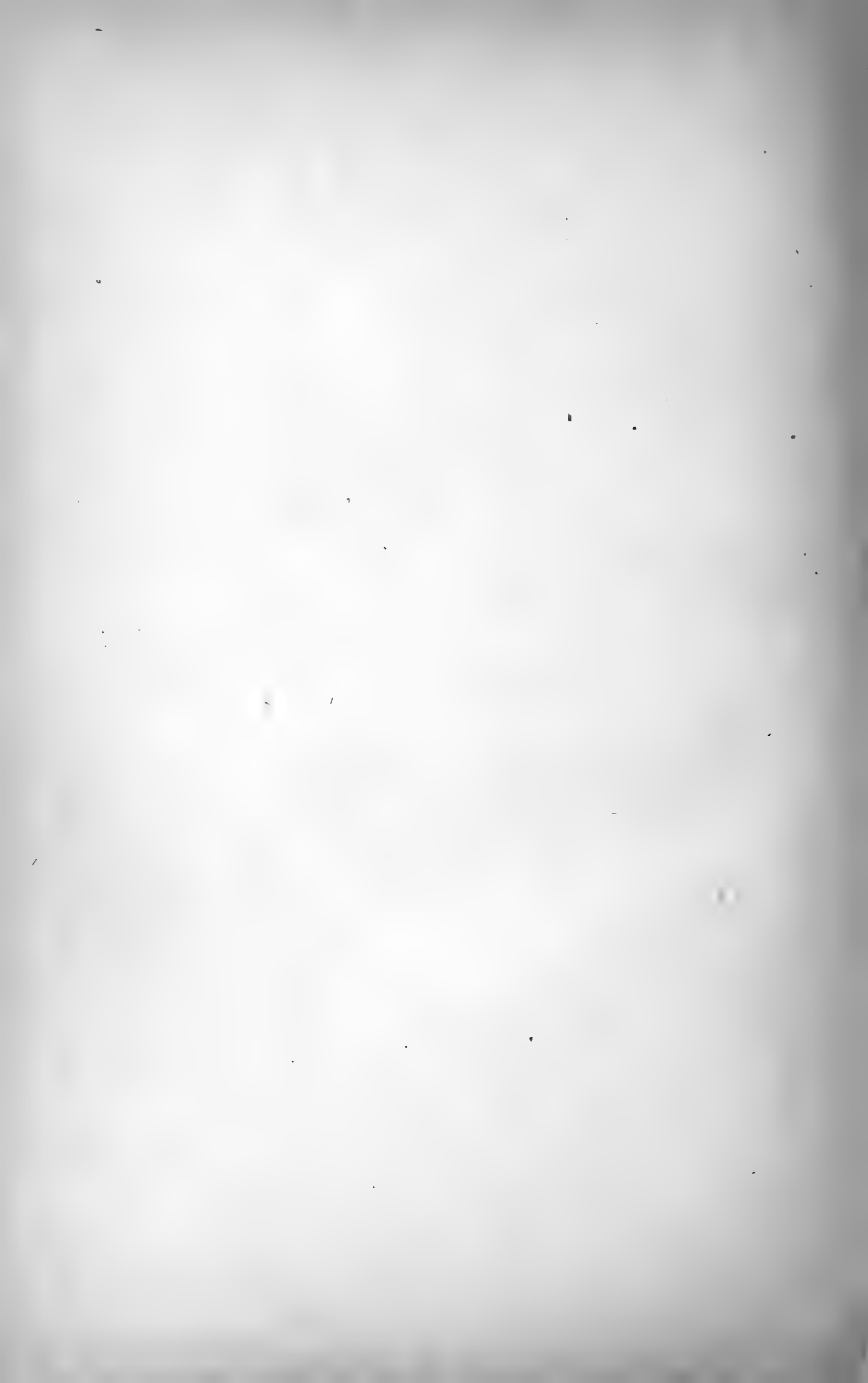
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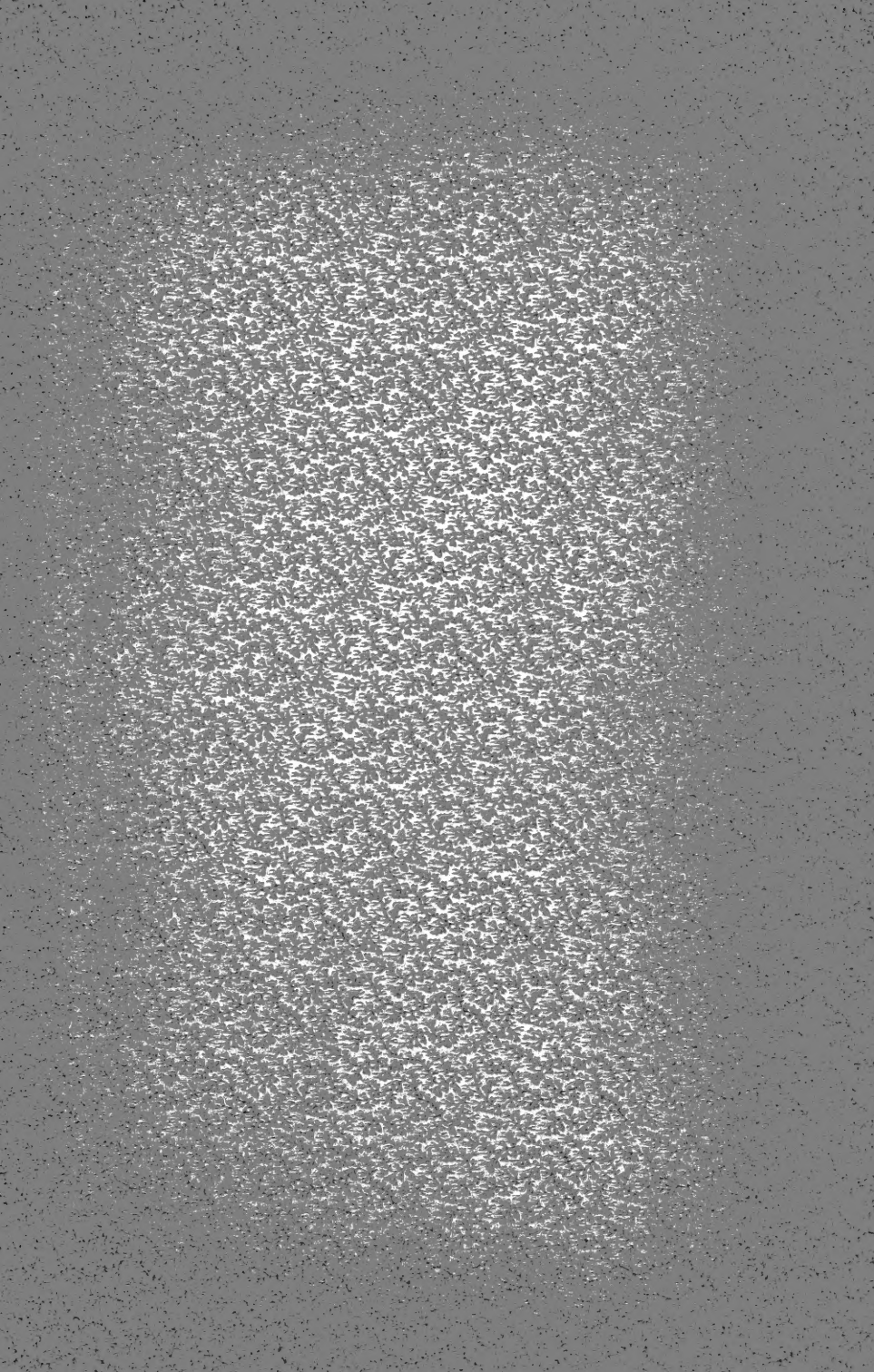
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